Missouri State Board of Agriculture.

Compliments of

Geo. B. Ellis,

Secretary.

A general view of Missouri's Agricultural Exhibit. It required 6,000 bushels of Corn and 200 bushels of other grains besides tons of grasses and grains in the straw to make up the exhibit.

Missouri's Corn Palace. Cost $10,000. Dimensions, 40 feet in diameter and 60 feet high. This was the finest of all special state exhibits.

Thirty-Seventh Annual Report

OF THE

MISSOURI

State Board of Agriculture

A Record of the Work for the Year 1904

ALSO VALUABLE INFORMATION ON BREEDING AND FEEDING LIVE STOCK, IMPROVING THE FERTILITY OF THE SOIL, GROWING CROPS, DAIRYING, AGRICULTURE AND LIVE STOCK STATISTICS, ETC.

PUBLISHED 1905.

THE HUGH STEPHENS PRINTING COMPANY
JEFFERSON CITY, MO.

OFFICERS OF STATE BOARD OF AGRICULTURE 1905.

President—C. F. Afflick, Clarence.

Vice-President—S. H. Prather, Tarkio.

Secretary, Geo. B. Ellis, Columbia.

Assistant Secretary—Miss Snowdon B. Willis, Columbia.

Treasurer—H. H. Banks, Columbia.

EXECUTIVE COMMITTEE.

C. F. Afflick, Clarence.

S. H. Prather, Tarkio.

F. B. Mumford, Columbia.

W. C. Howell, Ulman.

J. J. McNatt, McNatt.

W. R. Wilkinson, St. Louis.

J. J. Conrad, Marble Hill.

EX-OFFICIO MEMBERS.

Governor of Missouri—Jos. W. Folk.

Superintendent of Schools—W. T. Carrington.

Acting Dean Agricultural College, F. B. Mumford.

CORPORATE MEMBERS.

Cong. dist.	Name.	Residence.	County.
	(Term expires July 20, 1906.)		
1	Charles F. Afflick	Clarence	Shelby
4	H. S. Prather	Tarkio	Atchison
7	Frank C. Hayman	Houstonia	Pettis
8	Wm. C. Howell	Ulman	Miller
15	John J. McNatt	McNatt	McDonald
	(Term expires July 20, 1907.)		
6	John Deerwester	Butler	Bates
9	J. A. Potts	Mexico	Audrain
10	M. B. Greensfelder	Clayton	St. Louis
11	Norman J. Colman	St. Louis City	Holland Bldg.
12	W. R. Wilkinson	St. Louis City	212 N. Main St.
	(Term expires July 20, 1905.)		
2	John W. Hill	Chillicothe	Livingston
3	Alex. Maitland	Richmond	Ray
5	W. L. Bryant	Independence	Jackson
13	J. J. Conrad	Marble Hill	Bollinger
14	Ferd J. Hess	Charleston	Mississippi
16	A. T. Nelson	Lebanon	Laclede

OFFICERS OF STATE FAIR DIRECTORY.

President—J. A. Potts, Mexico.

Vice-President—John W. Hill, Chillicothe.

Secretary—J. R. Rippey, Sedalia.

Treasurer—Chas. E. Yeater, Sedalia.

EXECUTIVE COMMITTEE STATE FAIR DIRECTORY.

J. A. Potts, Mexico.
Alex. Maitland, Richmond.
John Deerwester, Butler.
John W. Hill, Chillicothe.
Norman J. Colman, St. Louis.
F. C. Hayman, Houstonia.
A. T. Nelson, Lebanon.

STATE VETERINARIAN AND DEPUTIES.

D. F. Luckey, State Veterinarian	Columbia
Horace Bradley, Deputy State Veterinarian	Windsor
E. Brainerd, Deputy State Veterinarian	Memphis
W. L. Berry, Deputy State Veterinarian	Joplin
L. D. Brown, Deputy State Veterinarian	Hamilton
Henry Boetner, Deputy State Veterinarian	Perryville
James Cullison, Deputy State Veterinarian	Charleston
Chas. Doenie, Deputy State Veterinarian	Boonville
H. V. Goode, Deputy State Veterinarian	St. Joseph
E. M. Hendy, Deputy State Veterinarian	Jefferson City
R. B. Love, Deputy State Veterinarian	Springfield
R. C. Moore, Deputy State Veterinarian	Kansas City
H. M. McConnell, Deputy State Veterinarian	Marshall
F. W. O'Brien, Deputy State Veterinarian	Hannibal
H. P. Poage, Deputy State Veterinarian	Shelbina
J. H. Slater, Deputy State Veterinarian	Richmond
Sam Sheldon, Deputy State Veterinarian	Trenton
Stanley Smith, Deputy State Veterinarian	Columbia
T. E. White, Deputy State Veterinarian	Sedalia
H. H. Wolf, Deputy State Veterinarian	Maryville

Associate Organizations.

IMPROVED LIVE STOCK BREEDERS' ASSOCIATION.

President—T. J. Wornall, Liberty.

Vice-President—J. A. Funkhouser, Plattsburg.

Vice-President (Horse Breeders')—R. L. Harriman, Bunceton.

Vice-President (Swine Breeders')—L. E. Frost, Moberly.

Vice-President (Sheep Breders')—J. W. Boles, Auxvasse.

Secretary—Geo. B. Ellis, Columbia.

Treasurer—J. C. Hall, Rocheport.

Members Executive Committee—W. P. Harned, Vermont; Benton Gabbert, Dearborn.

MISSOURI CORN GROWERS' ASSOCIATION.

President—E. E. Laughlin, Rich Hill.

Vice-President—M. F. Miller, Columbia.

Vice-President—C. O. Raine, Canton.

Vice-President—J. N. Price, Trenton.

Vice-resident—P. E. Crabtree, Hannon.

Vice-President—N. B. Graham, Fredericktown.

Secretary and Treasurer—G. M. Tucker, Blodgett.

MISSOURI STATE DAIRY ASSOCIATION.

President—W. W. Marple, St. Joseph.

First Vice-President—M. E. Moore, Cameron.

Second Vice-President—M. V. Carroll, Sedalia.

Secretary—C. H. Smalley, Kansas City.

Treasurer—B. C. Settles, Palmyra.

LETTER OF TRANSMITTAL.

State Board of Agriculture, Office of the Secretary,
Columbia, Mo., March 17, 1905.

To His Excellency, Joseph W. Folk, Governor of Missouri:

Sir—I have the honor to transmit herewith a copy of the 37th annual report of the State Board of Agriculture for the year 1904.

Missouri's claim for being the first agricultural State of the Union has been demonstrated beyond question by the record of the winnings of the farmers made at the World's Louisiana Purchase Exposition. By international juries Missouri has been awarded, in competition with every state and nation of any consequence in the world, a greater aggregate number of prizes on agriculture, horticulture, live stock and poultry products than any other state or nation. To Missouri was awarded 298 prizes in agriculture, 372 prizes in horticulture, 2 prizes in dairying, 790 prizes in live stock and 617 in poultry. To maintain this high position will command the best efforts of our farmers and demand the greatest possible encouragement of the State.

That the Board of Agriculture is a prominent factor in maintaining the high standard of Missouri as an agricultural and live stock commonwealth is clearly shown by the fact that the publications of the Board are in greater demand than ever before.

Respectfully,
GEO. B. ELLIS,
Secretary.

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ANNUAL MEETING.

Office of Secretary,
Columbia, Mo., December 20, 1904.

As provided by law, the State Board of Agriculture convened in annual session at 7:30 p. m. In the absence of the President, the Board was called to order by the Vice-President, Mr. C. F. Afflick. The following order of business was transacted:

Roll call by the Secretary, the following responding: W. T. Carrington, F. B. Mumford, C. F. Afflick, S. H. Prather, John Deerwester, F. C. Hayman, W. C. Howell, Moses B. Greensfelder, Norman J. Colman, J. J. Conrad, J. J. McNatt and A. T. Nelson.

Reading of the minutes of the previous meeting was dispensed with, and upon motion of Governor Colman, the minutes were approved as printed in the 36th annual report.

The Secretary read the following report, which was accepted and ordered printed in the 37th annual report:

REPORT OF SECRETARY.

Gentlemen of the Board of Agriculture:

This meeting closes the work of the fortieth year of the existence of the Missouri State Board of Agriculture, and I respectfully submit herewith my report of the work of this office for the year, with some comments on what has been accomplished and suggestions looking to the improvement of the work in the future.

Representing, as this Board does, under the authority of the State, all the agricultural interets of one of the leading live stock and crop-producing commonwealths of the greatest agricultural nation on the globe, we have no little onerous duty to perform. A retrospective view of the forty years' record will show that the Board of Agriculture has since its beginning been a very potent factor in organizing, promoting and

fostering every commendable agency for the development of our varied agricultural interests. An examination of the records of the Board will show that it has given its earnest support to the establishment and maintenance of the Agricultural College, the Experiment Station, county and district agricultural associations, Live Stock Breeders' Associations, the Corn Growers' Association, the Road Improvement Association, the Farmers' Institute work, live stock inspection and State veterinary work and others of no less importance. But how are we to know what good has been accomplished? What reason can we give that the work of the Board for these forty years has been profitable to the State and which would merit a continuance of our commission in the future? The opportunity to prove what has been accomplished by the united agencies that have been stimulated to better effort by your fostering care has been given by the holding within the borders of our State the greatest competitive international exposition ever held in the history of the world.

At the Louisiana Purchase Exposition, held in St. Louis during this year 1904, the farmers of Missouri have had the opportunity of measuring their progress in the achievements of the sciences of agriculture and live stock husbandry, not only with the best farmers and stock breeders of the United States, but with the best farmers and stock breeders of every enlightened nation on earth. What is the result as told by the official records? Missouri won a greater number of prizes in the aggregate in all classes of products of the farm competing, than any other state or nation.

Many of the problems with which the farmers of the State are concerned today are different from those which demanded the attention of the farmers forty years ago. Then one great problem was that of transportation for their products so that they could take advantage of the markets of the world; now our State is checkered with railroads, and we are in almost daily touch with the cities and ports of the entire United States. Then the problem was to build railroads; now it is to build good wagon roads. Then the problem was to clear the forests and to find use for the timber; now it is to find timber to meet our wants. Then the problem was to find what crop or what breed of live stock was adapted to our environment; now it is to improve the quality of well established crops and breeds. Then the problem was to plant the orchard; now it is to cultivate and protect it from insects and disease. Then we tilled a soil rich in humus and increased the product by cultivating more land; now we till a soil with the humus burned up and the problem is to increase the product by building up the soil, improving the seed and practicing better methods of cultivation. Our work of

today is lightened because of the efforts of our predecessors of thirty and forty years ago. Shall we do our work so that it will lighten the burdens of those to come after us? These and many others are sufficient reasons for our continued efforts.

FARMERS' INSTITUTES.

The first effort looking to the organization of Farmers' Institutes in Missouri was made by the Board of Agriculture at the annual meeting held in St. Louis, September 9, 1869. The corresponding secretary, Hon. Chas. W. Murtfeldt, suggested the advisability of inaugurating farmers' institute work. Hon. Norman J. Colman, who was then as now a member of the board, offered a resolution embodying the suggestion of the secretary and pledging the support of the members. The resolution was adopted but, evidently for lack of funds, no meetings were held. The next effort made to organize the institutes was at the annual meeting held November 1, 1882. Prof. J. W. Sanborn, then Secretary of the Board, and Dean of the Agricultural College, urged the importance of institute work, and after some deliberation the Board authorized the beginning of the work, and in accordance with that action the first Farmers' Institute meeting was held in Independence on December 18 and 19, 1882. From that time on a few meetings were held each year, conducted largely by the Secretary and members of the Board, receiving no pay except traveling expenses, which were paid from the contingent funds of the Board.

In 1891 the Legislature made the first appropriation specifically for institute work. Since the first organization the institute has had a steady development, and during the season for 1903-4 there were held one hundred and forty-seven meetings with a total attendance of thirty thousand two hundred and twenty people, and with twenty-eight lecturers on the staff. Up to this time only fifty meetings have been held in the season of 1904-5. On account of the great interest in the World's Fair and the excitement over the presidential campaign it was thought better to begin later and extend the work more into the winter. The lecturers report an increased interest of those present, although the attendance has not been up to the high average of the year before.

Subjects relating to the improvement of the corn crop which were discussed at the meetings in every county in 1903 are bearing the expected fruit, and more attention is being given to breeding and selecting seed corn than ever before. I beg the Board's consideration of two suggestions I wish to make for the improvement of the institutes:

First—I suggest the organization of women's institutes, either as

a separate organization or in connection with the regular institute. Several other states are successfully conducting women's institutes, and I see no reason why Missouri should not make an effort in this direction.

Second—I suggest the organization of experimental unions in co-operation with farmers' institutes and with the Experiment Station, for the purpose of diffusing the knowledge gained at the Experiment Station, and for the further reason of meeting the present demands for more practical work along all educational lines. The unions can be organized by the Board of Agriculture, the experiments outlined by some one from the Experiment Station and after the crops are gathered, a report of the experiments can be made and the subjects discussed at the annual institute meeting.

AGRICULTURAL EDUCATION.

One of the most important duties enjoined upon your Board by the statutes of the State is to make recommendation concerning the adoption of a system of public instruction in subjects relating to agriculture. Section 4702, R. S. 1899, provides as follows:

"Section 4702. Duties of the Board.—The State Board of Agriculture shall be and is hereby constituted the body which shall have supervision of all the legalized departments and institutions of the State which are for the advancement of agriculture. It shall as a body, or by a committee selected by the Board, be a board of examiners of the State Agricultural and Mechanical College and Experiment Station. While in no way limiting the power of the Board of Curators of the State University, the Board of Examiners shall, at least once in each year, carefully examine into the affairs of the College and Experiment Station, including the treasurer's account, in reference to the amount and sources of the income of the College and Experiment Station, and how expended, the qualifications of those engaged in teaching and those engaged in experimental work, and the character of the work done. The Secretary of the Board of Agriculture shall be furnished with the information thus elicited, together with such recommendations as may be deemed necessary, for publication in the annual report of the Board. The Board of Agriculture shall have charge of the veterinary service of the State, the appointment of the State Veterinarian, and; with the advice of the veterinarian, of deputies, inspectors and other assistants. It shall be the duty of the Board, through its secretary, to gather crop and stock statistics, meteorological data, and information as to the best and most profitable means of farming, stock raising, fruit growing, etc., and publish the same in bulletins as frequently as may be deemed expedient; to hold farmers' institutes in different parts of the State for the purpose of giving instruction in agriculture; to make an annual report to the general assembly of the State, embracing the proceedings of the Board for the past year, and an abstract of the reports and proceedings of the several agricultural societies of the State, accompanied by such recommendations, including especially such a system of public instruction on these subjects, as may be deemed useful."

During the past year this office has published a bulletin prepared by State Superintendent of Public Schools, Hon. W. T. Carrington, on the subject of "Elementary Agriculture for the Public Schools." This bulletin is an outline or elementary treatise on teaching agriculture in the rural and high schools of the State. The bulletin has been put into

the hands of several thousand teachers and pupils, and the subject has been introduced into a great many schools, and in a few years we will, no doubt, see the beneficial results. Allow me to suggest, however, that it is evidently apparent to anyone familiar with our present rural district system, where only one teacher is employed, who teaches all grades from the first to the eighth, that the instruction along this line must be either elementary or fragmentary.

Upon the other hand, we have our Agricultural College, which we are pleased to see taking such high rank among schools of its class in this country. We are forced to admit, however, that when the district school has done its work well and when the Agricultural College reaches its highest expectation, there is yet a very broad field in agricultural education that is not being filled. To repeat, the training in the rural schools is too elementary and that of the Agricultural College is out of reach, in practice if not in theory, of the average farm boy or girl. The pressing need, it seems to me, and one that is entirely practical and opportune at this time, is the establishment of county or distirct agricultural schools. The course of study adopted for these schools should be in lieu of the high school course, and should admit boys and girls who have completed the course in the rural schools. The average farm boy who expects to stay on the farm cannot afford the time, to say nothing of the expense, of four years in the high school and then four years in the Agricultural College, but with the establishment of the county or district agricultural school, where a practical and sane course should be taught, thousands of them will avail themselves of the opportunity. The Board of Agriculture encouraged and fostered the establishment of the Agricultural College and Experiment Station, and I believe should lead now in the establishment of the county or district agricultural school.

STATE VETERINARY WORK.

During the year the State Veterinarian and deputies have made two hundred and sixty-three official visits to answer calls made by petition or other satisfactory evidence for the need of investigation. Of this number one hundred and twelve were from Kansas City, and one hundred and fifty-one from the rest of the State. In Kansas City eighty-two cases of glanders have been reported as compared with two hundred and sixty-eight cases of glanders in 1903, a decrease of one hundred and eighty-six cases. Outside of Kansas City fifty-nine cases of glanders have been reported, compared with forty-nine cases in 1903, an increase of ten cases. (A case here means all animals found affected

at the time of the visit, whether one or more.) Of the entire number two hundred and sixty-three visits the following classification is made:

Cases of glanders for Kansas City	82
Cases of glanders for rest of State	59
Cases of scabies, whole State	17
Cases of Texas fever, whole State	11
Cases of rabies, whole State	4
Cases of ergotism, whole State	2
Cases of anthrax, whole State	1
Cases of tuberculosis, whole State	1
Miscellaneous cases, State	86

The eighty-six cases classed as miscellaneous were of a less dangerous character, many of them not contagious.

The thorough and effective manner of the control work is shown by the fact that not a single case has been reported as having originated with any of the diseased animals, outside of those which were already exposed at the time they were quarantined.

At the meeting of the executive committee held on June 1st, the committee was informed that the public watering troughs in Kansas City had been opened up for public use, and that the number of cases of glanders had increased from none at all in April to seventeen cases for the month of May. After due deliberation the committee instructed the secretary to notify the authorities in charge at Kansas City that unless the watering troughs were removed or kept closed from public use, until all apparent danger was passed, that within ten days the Board of Agriculture would declare a quarantine against the city. In reply to this notice this office was informed by his Honor, the Mayor of Kansas City, that the watering troughs had been closed indefinitely. There was but one case reported from the city for November, and with the continued co-operation of the city authorities the further spread can be kept under control or entirely eradicated.

During the year Dr. Jesse Robards has acted as cattle inspector in southern Missouri, giving most of his time to looking for infested cattle in this State, and giving the owners instruction about disinfecting their cattle and clearing the pastures of the ticks. Only a very few herds of infested cattle have been found this year.

QUARANTINE REGULATIONS.

The cattle quarantine regulations adopted at the last annual meeting, and which were approved and promulgated by proclamation of the Governor on December 22, 1903, I believe fully meet all emergencies, and can safely be continued without amendment.

The State Veterinarian made a verbal report explaining in detail the work of the Veterinary Department and outlining some future work.

The Veterinarian promised to prepare a written report for printing in annual report.

The Veterinarian nominated the following persons for deputy veterinarians:

Dr. Sam. Sheldon, Trenton, Mo.

Dr. H. M. McConnell, Marshall, Mo.

Dr. Henry Boetner, Perryville, Mo.

Dr. Chas. Doenie, Boonville, Mo.

Dr. J. H. Slater, Richmond, Mo.

Dr. R. H. Goodbody, 3900 Washington Ave., St. Louis, Mo.

Dr. Stanley Smith, Columbia, Mo.

Moved by Governor Colman that the nominations be approved and the names presented be appointed to the position of deputy veterinarians. Motion carried.

Moved by Governor Colman that the services of the Live Stock Inspector be discontinued by the Secretary whenever in his judgment the conditions in southern Missouri did not longer demand his services. Motion adopted.

The committee appointed by the President to examine and report on the Agricultural College, made the following report:

REPORT OF THE AGRICULTURAL COLLEGE COMMITTEE.

Mr. President:

Your Committee have made a careful examination of the work and progress of the Agricultural College and Experiment Station, and beg leave to submit the following report:

1. We heartily commend the general improvement in the work and better equipment for instruction throughout the College of Agriculture. We heartily commend the efforts of the Board of Curators to bring the College of Agriculture to the same high standards of educational efficiency as the other departments in the University. Two-thirds of the people in Missouri are maintained directly or indirectly by the products from Missouri farms. It is the opinion of your Committee, therefore, that the University should continue to expand and develop the College of Agriculture and Experiment Station until it is second to none in the country.

2. We desire to approve especially the equipment of a Soils Laboratory in which the fertility of the soils of the State shall be thoroughly investigated. We also note a slight increase in the herds of cattle, sheep and swine on the College Farm. The Dairy Department is now well equipped throughout for giving the highest grade of instruction in Dairy

Husbandry. The departments of Veterinary Science and Horticulture have also added materially to their libraries and laboratories.

3. The equipment of the College Farm has been greatly improved by the erection of a cattle feeding shed 300 feet long by 30 feet wide, and the erection of a sheep barn. The foundation of the new cattle barn is also well constructed and when completed, will greatly facilitate the work of the Department of Animal Husbandry. We note with especial satisfaction the general improvement in the appearance of the College Farm, made possible by the erection of new fences and yards.

4. We commend the short courses and believe they are doing much good in improving Agriculture in Missouri.

5. The Experiment Station is of great value to the farmers of the State. We commend the experiments in Animal Husbandry, Horticulture, Soils, Farm Crops, Animal Diseases and Injurious Insects.

6. We appreciate the fact that the largely increased attendance in the College of Agriculture requires more liberal appropriations.

7. We especially recommend the following appropriations to provide for the imperative needs of the Agricultural College and Experiment Station:

For completion of the cattle barn	$8,000 00
For building of swine barn	3,000 00
For buying pure bred live stock	10,000 00
For a veterinary hospital	15,000 00
For equipping the department of Agronomy	10,000 00
For Experiment Station	15,000 00

All of which is respectfully submitted.

Norman J. Colman,
Jacob J. Conrad,
Arthur T. Nelson,
Committee.

Mr. Hayman moved the adoption of the report. Motion carried.

Mr. Carrington offered the following resolution:

Resolved, That a standing committee of five members be appointed by the President on Agricultural Education, whose duty it shall be to act for the Board on all matters concerning the promotion of agricultural education in Missouri, and any reasonable expenses incurred in attending the meetings of the committee, are hereby authorized to be paid out of any available funds of the Board, upon approval of the accounts by the Executive Committee.

After considerable discussion on the different methods of promoting agricultural education, the resolution was unanimously adopted.

The President announced the appointment of the following Com-

A MISSOURI ROADSTER—FIRST PRIZE WINNER.

"Scotch High Ball:" Bay gelding, 15¾ hands high, 5 years old. Out of nine entries at the World's Fair, 1904, he succeeded in winning three first, three second and one third prize, and received more universal praise than any single roadster shown. Also won the championship in the Central Missouri circuit, defeating twelve high class entries. Owned and exhibited by Alex. Bradford, Jr., Columbia, Mo.

mittee on Agricultural Education: W. T. Carrington, F. B. Mumford, The Governor of the State, F. C. Hayman, M. B. Greensfelder.

ELECTION OF OFFICERS.

The following officers were elected for the ensuing year:

President, C. F. Afflick; Vice-President, S. H. Prather; Secretary, Geo. B. Ellis; Assistant Secretary, Miss Snowdon B. Willis; Treasurer, H. H. Banks.

The following members of the Executive Committee were elected: C. F. Afflick, S. H. Parther, F. B. Mumford, W. R. Wilkinson, W. C. Howell, J. J. Conrad and J. J. McNatt.

Moved by Governor Colman that all power vested by law in the Board of Agriculture be and is hereby delegated to the Executive Committee, and that the Executive Committee is hereby authorized to act for the Board at any and all times when the Board is not in session. Motion carried.

The Auditing Committee appointed by the President to examine the books and accounts of the Secretary and Treasurer, made the following report:

REPORT OF AUDITING COMMITTEE.

We, the undersinged committee authorized to examine the books and accounts of the Secretary and Treasurer, beg leave to submit the following report:

We have carefully examined the vouchers authorized by the Executive Committee and the corresponding warrants issued by the President and Secretary of the different funds of the Board as follows:

DISTRIBUTION OF ANNUAL REPORT FUND.

We find that vouchers 115-116 inclusive have been approved and the corresponding warrants issued which have been paid and cancelled by the Treasurer, leaving no balance in this fund.

MONTHLY CROP REPORT FUND.

We find that vouchers 293-321 inclusive have been approved and the corresponding warrants issued, which have been paid and cancelled by the Treasurer, leaving a balance on hand in this fund of $159.71.

EXPENSE OF MEMBERS' FUND.

We find that vouchers 542-581 inclusive have been approved and corresponding warrants issued, which have been paid and cancelled by the Treasurer, leaving a balance in this fund of $464.92.

FARMERS' INSTITUTE FUND.

We find that vouchers 569-616 inclusive have been approved and corresponding warrants issued, which have been paid and cancelled by the Treasurer, leaving a balance in the fund of $1,002.83.

SECRETARY'S ACCOUNT.

We have examined the Secretary's account for expenses of Farmers' Institute meetings, and find that the Secretary has received from the Farmers' Institute Fund, as shown by warrants drawn in his favor on the Farmers' Institute Fund, including balance on hand December 15, 1903, of $688.05, a total of $4,001.65. We find accounts filed which the Secretary has paid and for which he has corresponding receipts for the total amount of $2,742.94, leaving a balance in the Secretary's account of $1,258.71.

OFFICE EXPENSE FUND.

We find that vouchers 500-533 inclusive have been approved and corresponding warrants issued, which have been paid and cancelled by the Treasurer, leaving a balance on hand in this fund of $158.73.

STATE VETERINARY FUND.

We find that vouchers 1477-1606 have been approved and corresponding warrants issued, which have been paid and cancelled by the Treasurer, leaving a balance in this fund of $860.11.

The examination above mentioned shows an exact agreement between the books of the Secretary and Treasurer of this Board concerning the financial transaction for the year.

All of which is respectfully submitted.

M. B. Greensfelder,
Frank C. Hayman,
Committee.

Mr. Carrington moved the adoption of the report. Motion carried. There being no further business, the Board adjourned.

C. F. Afflick, President.
Geo. B. Ellis, Secretary.

SECRETARY'S FINANCIAL STATEMENT.

DISTRIBUTION OF ANNUAL REPORT FUND.

Date.	War. No.	Name.	Dr.	Cr.
1904.				
May 4......	115	By S. H. Elkins......	....	$120 00
" 4......	....	To requisition	$250 00	
June 2......	116	By S. H. Elkins......	....	130 00
			$250 00	$250 00

MONTHLY CROP REPORT FUND.

Date.	War. No.	Name.	Dr.	Cr.
1904.				
Jan. 1......	....	To balance	$73 42	
Feb. 2......	293	By Missouri Statesman......	....	$11 50
" 2......	294	H. H. Banks......	....	5 00
Mch. 2......	....	To requisition	100 00	
April 2......	295	By University Co-op......	....	90
" 2......	296	Missouri Statesman	....	8 00
" 2......	297	S. H. Elkins......	....	10 00
May 4......	298	S. H. Elkins......	....	15 00
" 4......	299	S. H. Elkins......	....	5 60
" 4......	300	Missouri Statesman	....	56 90
June 1......	301	S. H. Elkins......	....	22 40
" 1......	302	S. H. Elkins......	....	5 62
" 1......	....	To requisition	100 00	
July 1......	303	By S. H. Elkins......	....	10 00
" 1......	304	Barnes-Crosby Co......	....	6 96
" 1......	305	National Paper Co......	....	8 50
" 1......	306	Missouri Statesman	....	103 20
" 1......	307	S. H. Elkins......	....	10 00
" 1......	....	To requisition	100 00	
Aug. 1......	308	By H. H. Banks......	....	5 00
" 1......	309	S. H. Elkins......	....	3 69
" 1......	310	Missouri Statesman	....	102 50
" 1......	311	S. H. Elkins......	....	10 00
" 1......	....	To requisition	100 00	
Sept. 6......	312	By S. H. Elkins......	....	33 60
" 6......	313	S. H. Elkins......	....	10 60
" 6......	314	Missouri Statesman	....	3 00
" 6......	....	To requisition	100 00	
Oct. 1......	315	By National Paper Co......	....	49 93
" 1......	316	Wabash R. R. Co......	....	4 36
" 1......	317	Missouri Statesman	....	180 95
" 1......	318	S. H. Elkins......	....	8 00
" 1......	....	To requisition	300 00	
Nov. 1......	319	By S. H. Elkins......	....	6 50
" 1......	320	S. H. Elkins......	....	25 00
Dec. 1......	321	S. H. Elkins......	....	91 00
" 1......	....	To requisition	100 00	
" 19......	....	By balance	....	159 71
			$973 42	$973 42

EXPENSE OF MEMBERS' FUND.

Date.	War. No.	Name.	Dr.	Cr.
1903.				
Dec. 1......	....	To balance	$397 82	
" 15......	542	By W. G. Howell............................	....	$14 00
" 15......	543	H. J. Waters............................	....	9 70
" 15......	544	J. W. Hill............................	....	15 00
" 15......	545	Alex. Maitland	....	14 00
" 15......	546	Frank C. Hayman............................	....	11 50
" 15......	547	W. R. Wilkinson............................	....	10 85
" 15......	548	C. F. Afflick............................	....	10 60
" 15......	549	W. T. Carrington............................	....	5 20
" 15......	550	J. A. Potts............................	....	6 50
" 15......	551	N. J. Colman............................	....	12 00
" 15......	552	A. T. Nelson............................	....	27 70
" 15......	553	F. J. Hess............................	....	24 65
" 15......	554	J. J. Conrad............................	....	22 20
1904.				
Jan. 2......	555	H. F. Hand............................	....	14 00
Feb. 2......	556	J. J. Conrad............................	....	7 40
" 2......	557	W. L. Bryant............................	....	22 50
" 2......	558	W. C. Howell............................	....	18 20
" 2......	559	Geo. B. Ellis............................	....	13 20
" 2......	560	F. J. Hess............................	....	16 10
" 2......	....	To requisition	100 00	
May 4......	561	By J. J. Conrad............................	....	7 35
" 4......	562	F. J. Hess............................	....	14 75
" 4......	563	W. C. Howell............................	....	13 30
" 4......	564	Geo. B. Ellis............................	....	11 30
June 4......	565	W. L. Bryant............................	....	25 00
" 4......	566	J. J. Conrad............................	....	8 20
" 4......	567	W. C. Howell............................	....	15 00
" 4......	568	Geo. B. Ellis............................	....	11 70
" 4......	....	To requisition	100 00	
Sept. 6......	569	By F. B. Mumford............................	....	10 50
" 6......	570	C. F. Afflick............................	....	9 80
" 6......	571	J. J. Conrad............................	....	7 90
" 6......	572	W. C. Howell............................	....	14 80
" 6......	573	Geo. B. Ellis............................	....	12 35
Oct. 1......	574	J. J. Conrad............................	....	6 55
" 6......	575	W. C. Howell............................	....	15 30
" 6......	576	Geo. B. Ellis............................		11 60
Oct. 1......	....	To requisition	100 00	
Nov. 1......	577	By F. J. Hess............................	....	19 30
" 1......	578	W. C. Howell............................	....	15 15
" 1......	579	J. J. Conrad............................	....	7 00
" 1......	580	C. F. Afflick............................	....	10 70
" 1......	581	Geo. B. Ellis............................	....	10 05
" 1......	....	To requisition	300 00	
Dec. 19......	....	By balance	....	464 92
			$997 82	$997 82

FARMERS' INSTITUTE FUND.

Date.	War. No.	Name.	Dr.	Cr.
1903.				
Dec. 15		To balance	$1,192 18	
" 16	569	By S. A. Hoover		$22 30
" 16	570	Elmer Laughlin		54 15
" 16	571	A. J. Detweiler		20 75
" 16	572	G. R. Murray		115 75
1904.				
Jan. 2	573	Geo. B. Ellis		700 00
" 2	574	Geo. B. Ellis		50 00
Feb. 2	575	Geo. B. Ellis		50 00
" 2	576	Barnes-Crosby Co		5 15
" 2	577	Missouri Statesman		22 00
" 2	578	S. H. Elkins		3 35
" 2	579	H. H. Banks		15 00
" 2	580	Smith-Premier T. Co		7 80
Mch. 2	581	Missouri Statesman		99 10
" 2	582	Geo. B. Ellis		50 00
" 2		To requisition	200 00	
April 2	583	By Geo. B. Ellis		50 00
" 2	584	Barnes-Crosby Co		37 05
" 2	585	S. H. Elkins		3 81
" 2	586	S. H. Elkins		11 20
" 2	587	National Paper Co		23 58
" 2	588	Smith-Premier Typewriter Co		8 00
" 2	589	Missouri Statesman		95 56
" 2		To requisition	200 00	
May 4	590	By Barnes-Crosby Co		17 40
" 4	591	Geo. B. Ellis		50 00
" 4		To requisition	200 00	
June 4	592	By Geo. B. Ellis		50 00
July 1	593	Geo. B. Ellis		50 00
" 1	594	M., K. & T. R. R		4 00
" 1	595	Barnes-Crosby Co		16 50
" 1	596	W. E. Harshe		3 95
" 1	597	Missouri Statesman		32 50
Aug. 1	598	Geo. B. Ellis		50 00
" 1	599	Smith-Premier Typewriter Co		4 85
" 1	600	H. H. Banks		15 00
" 1	601	S. H. Elkins		65 00
" 1		To requisition	500 00	
Sep. 6	602	By Geo. B. Ellis		50 00
" 6	603	American Express Co		46 77
" 6		To requisition	500 00	
Oct. 1	604	By M., K. & T. R. R		10 00
" 1	605	Geo. B. Ellis		50 00
" 1	606	Missouri Statesman		2 00
" 1	607	Geo. B. Ellis		500 00
" 1	608	S. H. Elkins		44 80
Nov. 1	609	S. H. Elkins		13 00
" 1	610	Geo. B. Ellis		50 00
" 1	611	Geo. B. Ellis		1,000 00
" 1	612	E. F. Ammerman		8 23
" 1	613	S. H. Elkins		63 60
" 1		To requisition	2,000 00	
Dec. 1	614	By Geo. B. Ellis		50 00
" 1	615	Geo. B. Ellis		1,000 00
" 1	616	S. H. Elkins		97 20
" 1		To requisition	1,000 00	
" 19		By balance		1,002 33
			$5,792 18	$5,792 18

SECRETARY'S ACCOUNT.

Date.	Check No.	Name.	Dr.	Cr.
1903.				
Dec. 15		To balance	$688 05	
" 16	1	By R. G. Murray		$13 35
" 17	2	T. L. Kelso		4 00
" 19	3	C. D. Lyon		161 30
" 19	4	D. Ward King		112 79
" 21	5	E. B. Forbes		46 12
" 21	6	F. C. Hayman		2 00
" 21	7	W. F. McSparron		60 33
" 21	8	F. B. Mumford		29 88
" 21	9	G. M. Tucker		29 73
" 26	10	S. H. Elkins		10 00
" 26	11	W. F. McSparren		32 56
" 26	12	B. L. Seawell		23 37
" 28	13	S. H. Elkins		5 60
" 29	14	S. H. Elkins		5 60
1904.				
Jan. 2		To warrant No. 573, F. Inst. Account	700 00	
" 7	15	By Alex. Maitland		12 00
" 7	16	H. F. Hand		8 50
" 8	17	S. J. Melloway		5 25
" 8	18	T. S. Gordon		16 50
" 9	19	H. W. Mumford		21 98
" 9	20	J. D. Funk		26 60
" 9	21	Benton Gabbert		11 37
" 12	22	E. E. Chester		63 48
" 14	23	A. J. Detweiler		11 25
" 16	24	W. P. Harned		7 85
" 18	25	L. H. Gale		4 00
" 27	26	S. H. Elkins		5 00
Feb. 2	27	G. Hirschl		2 60
" 2	28	B. Piepmeier		2 60
" 4	29	S. J. McDaniel		4 00
" 5	30	D. Ward King		64 08
" 8	31	G. M. Tucker		3 15
" 11	32	S. H. Elkins		10 00
" 20	33	S. H. Elkins		10 00
" 24	34	W. L. Howard		30 00
" 29	35	S. H. Elkins		21 80
Mch. 1	36	W. L. Howard		1 87
" 3	37	G. W. Williams		9 15
" 3	38	Barnes-Crosby Co.		5 22
" 3	39	American Express Co.		1 53
" 3	40	S. H. Elkins		2 00
" 4	41	W. E. P. Pierce		10 70
" 21	42	S. H. Elkins		5 00
" 21	43	Chas. C. Hilton		2 25
" 22	44	G. M. Tucker		8 00
" 24	45	R. T. Ikenberry		16 75
" 25	46	D. E. Hulett		3 50
" 25	47	S. H. Elkins		6 00
" 28		To refund on postage by World's Fair Commission	18 00	
April 4	48	By C. H. Eckles		5 00
" 4	49	J. C. Whitten		9 75
" 8	50	D. A. Robnett		34 50
" 9	51	Geo. B. Ellis		6 85
" 9	52	C. H. Eckles		13 75
" 14	53	S. H. Elkins		11 00
" 16	54	S. H. Elkins		11 00
" 26	55	D. Ward King		222 72
" 30	56	S. H. Elkins		5 50
May 3	57	American Express Co.		5 63
" 27	58	G. F. Troxell		40 50
" 31	59	D. E. Hulett		10 42
June 7		To refund by office expense fund, warrant No. 517	40 50	
" 17	60	By R. M. Washburn		10 34
Aug. 17	61	Alphonso Bailey		3 60
" 25	62	S. H. Elkins		11 50
Sep. 3	63	S. H. Elkins		13 00
" 10	64	S. H. Elkins		55 10
" 13		To refund by Veterinary Fund, warrant No. 1571	21 50	
" 13		To refund on Monthly Crop Report Fund, warrant No. 312	33 60	
" 19	64	By S. H. Elkins		5 00
" 29	65	T. C. Scruggs		16 50

SECRETARY'S ACCOUNT—Continued.

Date.	Check No.	Name.	Dr.	Cr.
Oct. 1......	....	To warrant No. 607 on Farmers' Inst. Fund..	500 00	
" 3......	66	By D. Ward King........	....	42 15
" 3......	67	R. M. Washburn........	....	21 72
Oct. 3......	68	S. H. Elkins........	....	3 60
" 5......	69	G. W. Waters........	....	50 00
" 10......	70	S. H. Elkins........	....	8 00
" 12......	71	R. M. Washburn........	....	20 70
" 15......	72	F. B. Mumford........	....	23 45
" 15......	73	R. M. Washburn........	....	8 30
" 20......	74	D. Ward King........	....	50 00
" 20......	75	G. W. Waters........	....	50 00
" 20......	76	J. E. Pope........	....	12 80
" 20......	77	G. M. Tucker........	....	40 42
" 20......	78	F. P. Sever........	....	1 50
" 27......	79	E. H. Favor........	....	21 85
" 31......	80	S. H. Elkins........	....	3 53
Nov. 1......	....	To warrant No. 611, F. I. Fund........	1,000 00	
" 4......	81	By R. M. Washburn........	....	47 11
" 4......	82	J. M. Stedman........	....	57 92
" 7......	83	G. W. Waters........	....	100 25
" 7......	84	S. H. Elkins........	....	14 00
" 8......	85	C. D. Lyon........	....	92 93
" 14......	86	M. F. Miller........	....	6 20
" 14......	87	J. C. Whitten........	....	56 70
" 14......	88	D. Ward King........	....	156 62
" 15......	89	G. M. Tucker........	....	31 75
" 16......	90	Shannon Mountjoy	....	25 00
" 21......	91	R. M. Washburn........	....	26 43
" 28......	92	S. H. Elkins........	....	6 50
Dec. 1......	....	To warrant 615 on Farmers' Inst. Fund........	1,000 00	
" 1......	93	By M. M. Cunningham........	....	1 85
" 1......	94	D. Ward King........	....	246 70
" 2......	95	Mrs. D. Ward King........	....	14 17
" 3......	96	Geo. B. Ellis........	....	21 28
" 7......	97	Lynn Monroe	....	2 00
" 7......	98	H. C. Storrs........	....	2 00
" 12......	99	J. C. Whitten........	....	15 20
" 12......	100	C. R. Crosby........	....	18 04
" 19......	....	Balance	....	1,258 71
			$4,001 65	$4,001 65

OFFICE EXPENSE FUND.

Date.	War. No.	Name.	Dr.	Cr.
1904.				
Jan. 1......	....	To balance	$138 37	
" 2......	500	By J. W. Strawn..............................	....	$1 75
" 2......	501	J. R. Ellis..................................	....	15 85
" 2......	502	Snowdon Willis	....	10 00
Feb. 2......	503	Snowdon Willis	....	10 00
" 2......	504	J. R. Ellis..................................	....	16 23
" 2......	505	Columbia Gas Co...........................	....	14 00
" 2......	506	W. E. Harshe................................	....	95
Mch. 2......	507	Snowdon Willis	....	10 00
" 2......	508	Columbia Gas Works.......................	....	1 20
" 2......	509	Montgomery, Ward & Co.................	....	12 04
" 2......	510	J. R. Ellis..................................	....	16 26
" 2......	....	To requisition.....................................	100 00	
April 2......	511	By Wabash R. R. Co........................	....	1 14
" 2......	512	Snowdon Willis	....	10 00
" 2......	513	J. R. Ellis..................................	....	15 10
May 4......	514	Snowdon Willis	....	10 00
" 4......	515	J. R. Ellis..................................	....	15 85
June 1......	516	J. W. Strawn................................	....	85 46
" 1......	517	G. F. Troxell................................	....	40 50
" 1......	518	J. R. Ellis..................................	....	15 90
" 1......	519	Snowdon Willis	....	10 00
" 1......	....	To requisition.....................................	100 00	
July 1......	520	By Snowdon Willis	....	10 00
" 1......	521	J. R. Ellis..................................	....	18 66
" 1......	....	To requisition.....................................	100 00	
Aug. 1......	522	By Snowdon Willis	....	10 00
" 1......	523	J. R. Ellis..................................	....	15 30
Sep. 6......	524	J. R. Ellis..................................	....	16 10
" 6......	525	Snowdon Willis	....	10 00
6......	526	W. E. Harshe................................	....	1 50
Oct. 1......	527	Snowdon Willis	....	10 00
" 1......	528	J. Russell Ellis..............................	....	17 35
" 1......	....	To requisition.....................................	100 00	
Nov. 1......	529	By Snowdon Willis	....	10 00
" 1......	530	J. R. Ellis..................................	....	16 20
Dec. 1......	531	Columbia Telephone Co..................	....	7 10
" 1......	532	Snowdon Willis	....	10 00
" 1......	533	J. Russell Ellis..............................	....	15 20
" 1......	....	To requisition.....................................	100 00	
" 19......	....	By balance	....	158 73
			$638 37	$638 37

STATE VETERINARY FUND.

Date.	War. No.	Name.	Dr.	Cr.
1903.				
Dec. 15......	....	To balance	$1,485 74	
" 16......	1477	By Jesse Robards	....	$135 50
" 16......	1478	W. F. Berry....................................	....	31 70
1904.				
Jan. 2......	1479	Nora K. Hall....................................	....	35 65
" 2......	1480	F. O. Sawyer Paper Co.....................	....	48 90
" 2......	1481	Wabash R. R. Co..............................	....	2 78
" 2......	1482	W. F. Berry....................................	....	15 85
" 2......	1483	Jesse Robards	....	126 00
" 2......	1484	E. M. Hendy....................................	....	6 80
" 2......	1485	T. E. White......................................	....	48 20
" 2......	1486	Jesse Robards..................................	....	60 50
" 2......	1487	D. F. Luckey....................................	....	212 94
Feb. 2......	1488	L. D. Brown......................................	....	47 70
" 2......	1489	Horace Bradley	....	23 20
" 2......	1490	H. V. Goode.....................................	....	25 96
" 2......	1491	R. C. Moore......................................	....	66 45
" 2......	1492	D. F. Luckey....................................	....	186 58
" 2......	1493	Mattie M. Cunningham........................	....	8 90
" 2......	1494	A. E. Hickok.....................................	....	25 00
" 2......	1495	H. H. Banks......................................	....	30 00
" 2......	1496	Nora K. Hall.....................................	....	36 65
" 2......	1497	K. L. Salmon....................................	....	6 35
" 2......	1498	S. H. Elkins......................................	....	36 40
" 2......	1499	E. F. Ammerman................................	....	8 76
" 2......	....	To requisition	1,000 00	
Mch. 2......	1500	By R. C. Moore.................................	....	10 50
" 2......	1501	Lyman D. Brown................................	....	23 35
" 2......	1502	R. B. Love..	....	22 50
" 2......	1503	Jas. Cullison	....	9 00
" 2......	1504	D. F. Luckey.....................................	....	222 45
" 2......	1505	J. W. Connaway.................................	....	7 65
" 2......	1506	Jesse Robards	....	258 10
" 2......	1507	Nora K. Hall......................................	....	50 00
" 2......	1508	Missouri Statesman...........................	....	16 50
" 2......	1509	F. W. O'Brien....................................	....	10 80
" 2......	1510	Columbia Telephone Co......................	....	7 50
" 2......	1511	H. V. Goode.......................................	....	9 15
" 2......	1512	R. C. Moore.......................................	....	35 00
" 2......	....	To requisition......................................	500 00	
Apr. 2......	1513	By E. M. Hendy.................................	....	16 00
" 2......	1514	T. E. White	....	5 90
" 2......	1515	Jas. Cullison	....	8 50
" 2......	1516	D. F. Luckey......................................	....	205 37
" 2......	1517	S. H. Elkins.......................................	....	22 40
" 2......	1518	S. H. Elkins.......................................	....	10 60
" 2......	1519	E. F. Ammerman................................	....	9 28
" 2......	1520	H. V. Goode.......................................	....	28 96
" 2......	1521	L. D. Brown.......................................	....	27 40
" 2......	1522	Nora K. Hall.......................................	....	50 00
" 2......	1523	J. W. Connaway..................................	....	2 90
" 2......	1524	Missouri Statesman............................	....	106 15
" 2......	1525	W. F. Berry..	....	28 80
" 2......	....	To requisition......................................	500 00	
May 4......	1526	By J. S. Melloway	....	1 50
" 4......	1527	Jesse Robards	....	250 25
" 4......	1528	W. F. Berry..	....	25 45
" 4......	1529	H. H. Wolf..	....	18 50
" 4......	1530	J. W. Connaway..................................	....	2 90
" 4......	1531	W. P. Smith..	....	10 00
" 4......	1532	R. C. Moore..	....	49 60
" 4......	1533	F. W. O'Brien.....................................	....	27 50
" 4......	1534	D. F. Luckey.......................................	....	237 58
" 4......	1535	Nora K. Hall..	....	50 00
" 4......	1536	W. E. Harshe......................................	....	4 85
" 4......	1537	Smith-Premier Typewriter Co...............	....	40 00
" 4......	....	To requisition.......................................	500 00	
1904.				
June 1......	1538	D. F. Luckey.......................................	....	281 55
" 1......	1539	F. W. O'Brien.....................................	....	16 70
" 1......	1540	Nora K. Hall..	....	50 00
" 1......	1541	Jesse Robards	....	132 00
" 1......	1542	H. V. Goode..	....	14 00
" 1......	1543	Horace Bradley...................................	....	8 75
" 1......	1544	R. C. Moore..	....	66 40
" 1......	1545	Columbia Telephone Co......................	....	6 75

STATE VETERINARY FUND—Continued.

Date.	War. No.	Name.	Dr.	Cr.
June 1		To requisition	500 00	
July 1	1546	By Nora K. Hall		50 00
" 1	1547	R. B. Love		22 50
" 1	1548	Horace Bradley		14 00
" 1	1549	H. H. Wolf		8 00
" 1	1550	T. E. White		12 20
" 1	1551	H. V. Goode		13 05
" 1	1552	W. F. Berry		5 00
" 1	1553	D. F. Luckey		228 27
" 1	1554	Missouri Statesman		2 50
" 1	1555	E. F. Ammerman		82 20
" 1	1556	American Express Co		53 93
" 1		To requisition	500 00	
Aug. 1	1557	By Nora K. Hall		50 00
" 1	1558	D. F. Luckey		218 83
" 1	1559	Lyman D. Brown		43 76
" 1	1560	Jesse Robards		147 50
" 1	1561	H. H. Banks		30 00
" 1	1562	Jesse Robards		144 50
" 1	1563	R. B. Love		24 00
" 1	1564	E. F. Ammerman		4 43
" 1	1565	R. C. Moore		130 85
" 1	1566	Horace Bradley		16 60
" 1		To requisition	500 00	
Sep. 6	1567	By Columbia Telephone Co		7 45
" 6	1568	S. H. Elkins		5 04
" 6	1569	M., K. & T. R. R.		25 68
" 6	1570	Nora K. Hall		50 00
" 6	1571	S. H. Elkins		21 50
" 6	1572	T. E. White		15 00
" 6	1573	Horace Bradley		17 30
" 6	1574	D. F. Luckey		198 06
" 6	1575	Missouri Statesman		31 65
" 6	1576	W. F. Berry		7 45
" 6	1577	Lyman D. Brown		22 40
" 6	1578	Jesse Robards		141 25
" 6	1579	E. M. Hendy		10 45
" 6	1580	E. F. Ammerman		S7 25
" 6		To requisition	1,000 00	
Oct. 1	1581	By Smith-Premier Typewriter Co		11 50
" 1	1582	D. F. Luckey		229 39
" 1	1583	Barnes-Crosby Co		1 65
" 1	1584	Horace Bradley		39 75
" 1	1585	R. C. Moore		63 S0
" 1	1586	Nora K. Hall		50 00
" 1	1587	Missouri Statesman		3 00
" 1	1588	E. F. Ammerman		8 13
" 1		To requisition	500 00	
Nov. 1	1589	By R. B. Love		35 50
" 1	1590	Jas. Cullison		37 10
" 1	1591	Lyman D. Brown		48 84
" 1	1592	Jesse Robards		140 50
" 1	1593	Horace Bradley		26 10
" 1	1594	F. W. O'Brien		33 70
" 1	1595	R. C. Moore		24 60
" 1	1596	D. F. Luckey		229 79
" 1	1597	Nora K. Hall		50 00
" 1		To requisition	S00 00	
Dec. 1	1598	By F. W. O'Brien		48 99
" 1	1599	D. F. Luckey		263 93
" 1	1600	Nora K. Hall		50 00
" 1	1601	Lyman D. Brown		57 60
" 1	1602	Jesse Robards		159 50
" 1	1603	E. Brainerd		18 00
" 1	1604	W. F. Berry		7 50
" 1	1605	Jas. Cullison		10 50
" 1	1606	R. C. Moore		97 85
" 1		To requisition	500 00	
" 19		By balance		S60 11
			$S,2S5 74	$S,2S5 74

SUMMARY OF FINANCIAL STATEMENT.

Distribution of Annual Report Fund.

Date.		Dr.	Cr.
January 1, 1904	To balance on appropriation	$250 00	
	By vouchers paid		$250 00
		$250 00	$250 00

Monthly Crop Report Fund.

Date.		Dr.	Cr.
January 1, 1904	To balance	$73 42	
	balance on appropriation	1,250 00	
	By vouchers paid		$813 71
December 20, 1904	balance with our treasurer		159 71
	balance not drawn from State Treas.		350 00
		$1,323 42	$1,323 42

Expense of Members' Fund.

Date.		Dr.	Cr.
January 1, 1904	To balance	$397 82	
	balance on appropriation	600 00	
	By vouchers paid		$532 90
December 20, 1904	balance with our treasurer		464 92
		$997 82	$997 82

Farmers' Institute Fund.

Date.		Dr.	Cr.
January 1, 1904	To balance	$1,192 18	
	balance on appropriation	6,000 00	
	By vouchers paid		$4,789 35
December 20, 1904	balance with our treasurer		1,002 83
	balance not drawn from State Treas.		1,400 00
		$7,192 18	$7,192 18

Office Expense Fund.

Date.		Dr.	Cr.
January 1, 1904	To balance	$138 37	
	balance on appropriation	500 00	
	By vouchers paid		$479 64
December 20, 1904	balance with our treasurer		158 73
		$638 37	$638 37

State Veterinary Fund.

Date.		Dr.	Cr.
January 1, 1904	To balance	$1,485 74	
	balance on appropriation	8,700 00	
	By vouchers paid		$7,425 63
December 20, 1904	balance with our treasurer		860 11
	balance not drawn from State Treas.		1,900 00
		$10,185 74	$10,185 74

SECOND ANNUAL MEETING,

Missouri Corn Growers' Association.

Convened in Agricultural College, January 12, 1905. (Held under the auspices of the State Board of Agriculture.)

Abstract of Addresses Delivered.

PRESIDENT'S ANNUAL ADDRESS.

(E. E. Laughlin, Rich Hill, Mo.)

The Missouri Corn Growers' Association is entering upon its second year. I am glad to say the past year has been a prosperous one for the Association, however disastrous it has been for the corn crop. We were in a new field, not having a prestige to follow, nor having many breeders of pure-bred seed corn in the State. But if we keep up our pace in corn agitation, we will soon be abreast or ahead of our neighbor states.

Last year we encouraged members to write essays for the agricultural press. Others outside were moved to write, thus stimulating editors to give editorial space for corn. This had its part in causing a general awakening in the subject. At our farmers' institutes the prevalent interest to know more about corn was in evidence by the large audiences when the corn talks were announced.

The Secretary of the State Board of Agriculture has done much to make our association popular. It is always gratifying to have a Convention reported. The report of our first annual meeting was printed in bulletin form and given general distribution, and in advertising the farmers' institutes, the Missouri Corn Growers' Association Bulletin was generously used. We hope the coming year this literature can be extended to still more good. Along with good reading it has seemed wise to show good seed ears at farmers' institutes and I am sure will be pro-

lific of much good. The Agricultural College has shown us great favors and is ready to do more.

We are pleased to see the interest the railroads are taking in corn. One of the leading features the past year was the exhibit car, which was highly educational and I am assured will be given a prominent place in the industrial encouragement the coming year.

As to the future: We need the help from the Experiment Station in the study of corn for Missouri. We want to know more of the plant, the seed, the breeding, the different phases in feeding. We sorely need the information on seed—how large or small the kernel should be to give the best plant. When we consider how susceptible the corn plant is to the hand of man, how by selection we have the different varieties, popcorn, sweet corn, flint and dent; how by selection each joint may or may not produce an ear—is it not time that we have some scientific investigation on corn? The wheat plant has had special attention in Minnesota and Dakota, but not until recently has any state had special appropriation for corn. Let us stop and consider some of the possibilities of corn. You all doubtless know an acre of corn, (fifty bushels) will produce 600 pounds of pork—but what of human food? If we were confronted as Japan is, to what could we turn for food? Our dietary standards call for 4 4-5 bushels of wheat to sustain a person one year. Let us count that twenty-five bushels of corn, a very low product for one acre, will maintain 5 persons one whole year—each section of land more than 3,000 people. Or the corn crop of Missouri for the year 1902 would feed fifty million persons a whole year. So with this wonderful plant, let us have scientific investigations—some special money for corn study.

Our members of the Association can, however, do much in helping or stimulating corn shows. In these shows I would suggest, where moneys cannot be had, the use of the blue and red ribbon can be used effectively, being conducive of much educational value.

Last year we were desirous of doing the greatest good, and in asking advice from many, one was worthy of consideration. He said: "Get the membership enthusiastic on corn. When a great revivalist came to town the first thing was to get the members enthusiastic or consecrated, so when the time comes they will work." This week is a good time to become enthusiastic or consecrated to corn. Let us have a consecration acre. Dignify one acre for seed corn. This acre must be where it can be watched. It must be rich. Take the hog lot. It will take work to keep it clean, but this is what you must have to keep in touch with the seed plat. All of you doubtless have your seed picked

out. You ought to have an ideal ear in your minds. Out of this seed sort a bushel of the best ears. Then cull out, leaving only enough to plant the plat. Have them look as near alike peas in a pod as possible. Go over them many times. Learn the characteristics of each ear—for even if they are brothers they have each an individuality.

Here we have an ear with 56 grains in a row and 18 rows around. Multiply 56 by 18, it gives us 1,008 grains. There are about 3,500 hills in an acre. Placing two grains in a hill, we take 7,000 grains to plant the acre. So if all the kernels are planted and only one acre is used, it will give us the trouble of getting only 7 ears. With these 7,000 grains each grain should produce an ear as good as this one. This ear will shell one pound, or 120 bushels to the acre, provided there is no loss in germination, accidents or the greatest loss, not pure bred seed—not having the power to reproduce itself.

What an easy matter it will be to get a good start of corn if we apply ourselves. If you are not fortunate enough in having the variety desired, buy a bushel, paying a good long price, if necessary, and re-sort to get seed for the consecration acre. As I said, plant these 7 ears where they can be watched. Study the tiny plant. Study it at the first plowing. Study it up to ripening. Mark the desirable stalks. This will take time, but you are going to make it pay.

Consecrate one acre for good seed corn. Talk about it, plant it, plow it, study it. Pick next year's seed from this. Become enthusiastic on corn and next year come to Columbia and tell the Missouri Corn Growers' Association how you have succeeded.

DISCUSSION.

Mr. Ellis—Mr. Laughlin has suggested that the breeding plat should be the richest of the farm. That raises a very important question in my mind, whether we shall grow our seed corn on the richest land or whether we will not get better results by growing seed corn on a poorer soil, and changing it to better land. I would like to have that question brought out by some of the men who have been breeding corn.

Mr. Laughlin—The object in growing the seed corn on a rich plat is to make it *grow corn* and take on that characteristic and it will keep it up.

Mr. Mumford—I was thinking while the discussion was in progress of a historical event in connection with the improvement of farm crops. One of the most noted varieties of wheat, I suppose, that was ever produced anywhere was called the Hallet pedigreed wheat that was produced in England a good many years ago. A single kernel was

planted in a hill and the hills were one foot each way. The objection was offered that this was not an ordinary condition, that we do not plant wheat in that way, we broadcast or put it in thickly and that supposing you improve a variety under these conditions, it would not sustain its characteristics when grown in the ordinary way. The result was that in a few years' time the Hallet wheat produced a variety that yielded fifty bushels more under good conditions, and under all conditions, poor or rich soil, the Hallet wheat developed in that way became a better yielding variety than any other known at that time. The same thing may be said about improved live stock. A good many men say that in order to have good Shorthorn, Hereford or Angus cattle you must feed them. That is true, but at the same time it is true that good care and feed given to an animal or plant tends to develop in that plant or animal certain characteristics which the animal or plant will sustain, and it will tend to sustain these characteristics under favorable and unfavorable circumstances. If the circumstances are nearly like they were when that particular characteristic was developed—if, as in the case of beef breeds of animals—we continue to feed them and give them the same care, they will reach a still higher development; but even under scarcer feed and with less care, these animals will still have a tendency to fatness. Some animals will stay fat all the time and some animals under the same conditions will be lean. Corn is the same way. In order to develop a good ear—in order to develop that characteristic, we must supply the favorable conditions, that is, grow it on a fairly rich soil and we need not expect that if the corn is planted on a poor soil it will do as well, but it will have acquired the power to sustain these characteristics and will do better than unimproved varieties.

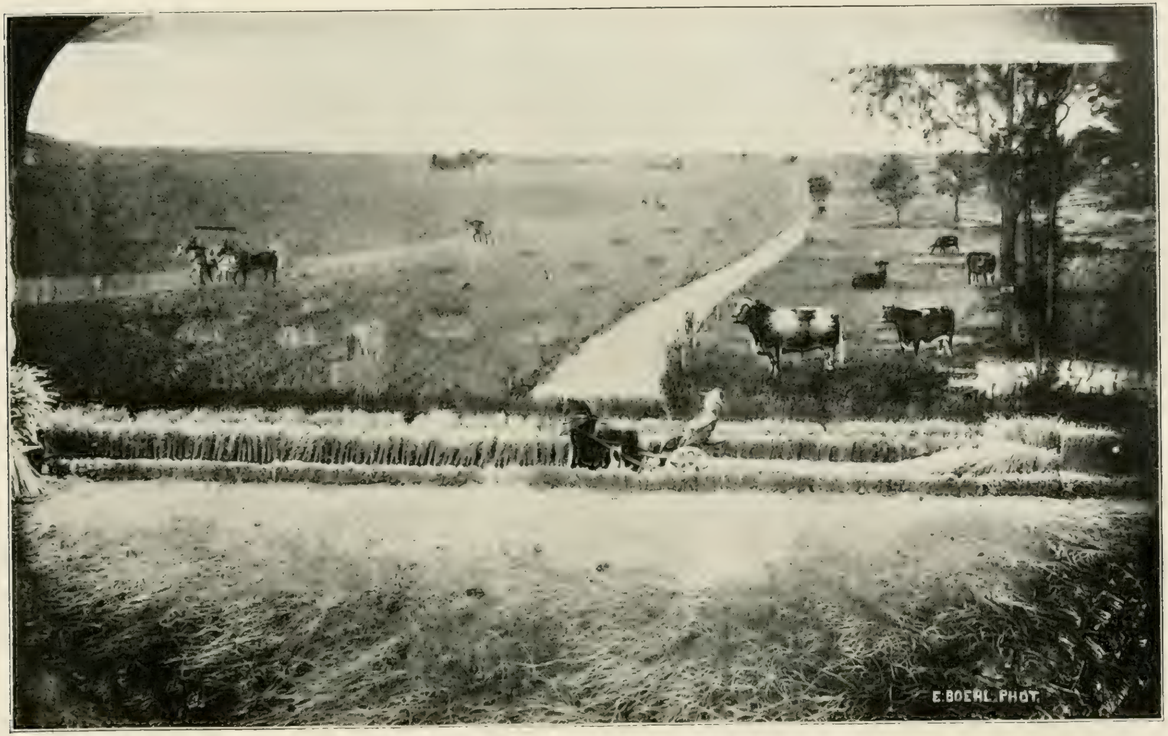
Dr. Huston—I remember the saying of Peter Henderson in discussing peas. He said: "You have produced the largest and the smallest pea, the earliest and the latest pea, but if someone would only produce the pea that will be eaten!" You must keep in mind what you are going to use your crop for. The great majority of the corn raised is raised with a view to feeding. The Indiana Station did considerable work along the line of investigation of the chemical composition of corn with a particular view to handling protein in connection with hominy corn. We did the same with field corn. It was no trouble to increase the protein, but unless great care was taken the corn became flinty, and the cattle would not eat it unless it was ground. We may say, we have the big and little corn, the early and the late corn, but give us the corn we can eat! That point must be kept in mind. Some of the stations that are working on corn are not keeping that point in mind.

In regard to the adaptability of corn to its locality, that is an exceedingly important thing. I notice that perhaps because in our work we have to go from here to the extreme northern end of the corn belt and from Ohio to the west on the Pacific coast and we see a great deal of variation in condition, and the corn which is highly esteemed in one locality you would not think of planting on your farm in Missouri, because you have a type that is much better adapted to your land. I have seen fine corn in some localities which would be totally out of place here. The most productive corn in Indiana for certain types of land—bottom land—and we have a good deal of it in Indiana—is grown on such a form of ear that it would not go in the score card at all, yet its average yield is twenty bushels more per acre than any other type of corn on that land. It is not a feeder, it is a corn seller. That may not be the best form of agriculture, but we have to have some of it.

Do not tie yourselves too firmly to the present score card. There is lots of very good, very profitable corn, corn of the highest type for specific purposes that today could not be scored on that card at all. It would be rejected. Those who are earnestly endeavoring to make a practical score card have that matter under consideration, and I have no doubt that you will soon have a much more flexible corn score card, one that will recognize certain particularly desirable ears, but will also recognize the practical application of your corn.

Mr. Gabbert—Corn planted in a very rich soil will develop the root better than on a poor soil, and I would not think it suitable for a clay soil after it was grown on a rich bottom land.

Dr. Tucker—We can go to extremes in this matter of variety of soils. We have such extreme types of soil that we cannot say we should plant on the best soil that we have, but we should plant in the best soil within certain limits of soil type. If we have prairie loam, we should plant in the best of that kind of soil. If we have a clay soil, we should plant in the best of that kind of soil. When we transfer our corn from one extreme to the other, as Mr. Gabbert has just said, there is such a variation in the root development that it does not bring out the characteristics that we want. The reason that we should plant on the best land of a certain type is because the plant is kept supplied with food in sufficient quantities to bring out the best characteristics of soil of a similar type, and which would not be brought out on another type of soil; hence the possibility of fixing qualities on a plant grown on a certain kind of soil. It is my practice to put the seed on the best of the type of soil on which I wish to plant my corn. There are extremes in soil types and a breed of corn cannot successfully be transplanted from one extreme in soil type to another.



A typical Missouri farm. This matchless work of art was made entirely of grain and attracted more attention from visitors than any other of the many mural grain pictures.

Mr. Forbes—There is one phase of this subject which has not been mentioned yet, the matter of variability. One of the first requirements to every improvement in plant or animal life is variability, that is, difference of individuality. If they were all alike there would be no possibility of improvement. From Darwin's time to the present day we must provide a plant with abundance of nutrition—that is the way plant breeders throw plants into variation, by putting them where there is abundance of nutrition and without these conditions we never develop the possibilities that there are in a plant. We never know what we have until we grow them under such conditions as induce variability and allow a plant to express its individuality.

Dr. Huston—In animal breeding you are dealing with the animal as an individual.

There is a law in regard to the development of plants which seems to be pretty well established, that is, as you increase the amount of available food for the plant, you increase the amount of vegetative stuff you produce as compared with the amount of reproductive stuff you produce in the plant. To put it in a different way, on your corn problem alone, if you continue to raise seed corn on your very best land, or your hog lot, if you please, you will tend to develop a type of corn with very large proportion of stalk to ear. If you want to raise the vegetative parts, the stalks and the leaves in excess, I have no doubt that you can develop such a type of corn by planting in your hog lots. I believe that this matter is worth taking into consideration in the breeding of your seed corn, not to plant it on too rich land unless you wish to produce only stalk. I assume you do not wish that. It is a matter worthy of consideration, the more you increase the vegetative part of your corn, the less you increase the seed.

Dr. Tucker—Another suggestion in regard to the rich land. By a rich land, I do not mean land with an excess of nitrogen, but I mean a well balanced land—a land which will be well balanced so far as nutriment for the plant is concerned, so that it will not grow to be a deformed plant either in stalk or grain. By a rich soil, I mean a soil that combines all the elements of plant food in an available form, so that we will not put the plant on the land and expect it to grow an especially rich stalk or leaf, but develop into a normal plant.

Mr. Ellis—I have had no experience in this matter myself. I wished only to have it brought out. It is an important matter for the farmer to know whether they shall continue their present method of corn selection. I believe farmers generally select their seed corn from the richest land for the reason that they get the best or largest ears there. The

point I hoped to be brought out has not perhaps been covered by any experiments that have been made. If I wanted to select an ear of corn to feed, without knowing anything about its chemical composition, of course, I would take the ear that had the greatest weight of grain on it. But if I select an ear to plant, there is something else to consider—whether it has the power of reproducing itself—whether it has the productive power, as Dr. Huston brought out in an indirect way, for making grain or fodder. This is my point— and I take it that our experiment stations are in the dark about it, because I have not heard anything on it yet—whether a good ear of corn grown in the poorest part of the field is not a better ear to plant for seed than an equally good ear grown in the best part of the field. That is it exactly. By growing the seed corn on land of at least moderate fertility, we will perhaps form characteristics of hardiness and grain productiveness that we will not get if we pamper our seed as we sometimes do our breeding cattle, and in that way impair their reproductive powers. This, I think, is a safe statement that it is better to plant seed on land as good or better than the soil where the seed grew, than it is to plant it on soil poorer than where it grew.

THE WORK OF OUR EXPERIMENT STATIONS ON CORN IMPROVEMENT.

(Prof. M. F. Miller, Department Agronomy, Agricultural College.)

The scientific study of corn has been in progress at our experiment stations since their establishment. Among the first problems attacked were those having to do with corn, but naturally they dealt almost entirely during the first decade with methods of culture, such as depth of plowing, time, manner and depth of planting, number of kernels per hill, distance apart of rows, hill and drill culture, depth and frequency of cultivation. Most stations reached more or less definite conclusions regarding all these problems. It was found for instance, that the depth of plowing depended largely upon condition, but in general the deeper the better up to a certain limit, this limit depending upon the soil in question. The distance apart of the hills was also found to be a matter of local condition, the richer the soil the closer the hills, other things equal; little difference was found in hill or drill culture when growing corn for grain, providing the same number of stalks were grown per acre and the matter again became one of soils largely, as some soils will bear one way cultivation better than others because they are not

so foul. The time and depth of planting was found to be a local and seasonal matter varying from one to three inches. The frequency and depth of cultivation were shown to depend largely upon the season, a depth of three inches being generally recommended for most soils, but with a slightly greater depth allowable early in the season. Level culture was found to be best for most upland soils while the frequency of cultivation for any soil is determined by the necessity of keeping a loose mulch on the surface.

The matter of corn improvement by selection and breeding was also begun early, but no great advancement was made until the matters of soil treatment above mentioned were definitely determined. Much advancement, however, has been made in the last half dozen years in this work, investigations following two general lines; first, the increase in total yield of corn or of grain and fodder per acre, and second, the improvement in the quality of the plant, more especially of the grain. In improving the quality two definite ideas have been in mind, the one to improve and fix certain varieties, the other to develop strains in which the grain varies in general constituents, such as starch, oil and protein, the idea being to produce corn of particular quality for a particular purpose. One of the most striking things shown by this work is the extreme susceptibility of corn to change through selection. It has been found, for instance, that it is possible to change the height at which ears appear on the stalk in any variety as much as 20 or 30 inches in 3 or 4 year's selection; that the same time is sufficient to develop a plant with heavy or light foliage with many or few suckers, with red or white cobs, etc. All experiments emphasize the fact that the corn plant is very readily changed either for good or for bad by close attention to the matter of selection and herein lies the importance of careful attention to its proper breeding.

The increase in yield per acre has been the end toward which most of the breeding has been directed, yet it is the one thing on which little definite results are obtainable, for the reason that it takes a number of years' averages to demonstrate whether or not a given variety of corn has been improved materially in its productive power; but that some varieties or some ears of corn when planted, have a prepotency or inherent property of producing more corn than others under exactly similar conditions, even when both have been grown in the same locality and under similar conditions has been definitely proven. The method then of finding just which ears will produce most corn and of propagating these is the problem which constitutes corn breeding for increased yield per acre, and various methods have been adopted by the

stations for determining the matter. For instance the most common method is to plant each selected ear in a row to itself on land that is perfectly uniform in fertility and general characteristics, give each exactly similar treatment and then determine the highest yielding row. Experiments at our own station the past year show that when tested in this manner some ears will produce twice as much as others, while experiments at various stations have given similar results. Should we take seed corn as we find it in a farmer's crib and make this same test we would find a much greater difference. The Iowa station made a test recently of the productive power of a series of corn samples gathered from farmers in the state of the kind which they were to use for planting that particular season. The result showed a variation in yield of from 8 to 91 bushels per acre. Some of this was undoubtedly due to poor germination and a consequent poor stand; but a large part was undoubtedly due to the natural character of the seed. Instances have come under my notice where ears planted thus in rows and with stands approximately uniform have shown an extremely great variation. Now since each ear possesses an individuality the same as an animal and is possessed of the power of transmitting good or poor qualities to its offspring, the possibilities of selection for the good ears in a breeding plot of this sort is indicated. To be sure we do not have a case strictly analogous to that of animal breeding as the ear is a collection of individuals and we usually do not know the character of the male parent which fertilized each particular grain. So far as the mother is concerned, however, or the plant on which the ear grew we do have the case exactly similar, and herein lies the most important means at our hand for exercising a selection. In the case of artificial pollination of ears by pollen from a stalk the character of which is known we may have a case almost exactly alike that of the animal breeder, but these methods in corn breeding require time and some expense so that they are necessarily the work of the experiment station or the scientific corn breeder. Not that the average farmer has not an abundant opportunity for improving his corn in the exercising of care in selection, but for the most painstaking and thorough work the average farmer has neither the time nor the means to devote to it.

There are several methods now being employed by the various experiment stations in the corn belt which thus seek to improve the yield and quality of the product of our corn fields. A common one is that which has already been mentioned, commonly known as the row method of selection. A perfectly uniform plot of ground is selected of sufficient size to give a length of about 100 hills to the row and a width

corresponding to the number of ears which it is desired to propagate, usually from 40 to 50. These 40 or 50 ears are carefully selected from the very best seed obtainable of any good variety adapted to the locality, or from the stock of the preceding year, and are planted one ear to each row so that the general character of the corn and fodder as produced from each of these ears may be accurately determined. Careful notes are taken regarding each ear to be planted before shelling and the test of its vitality is usually made by germinating a number of kernels. The tips and butts are discarded in order that all grains planted may be exactly alike as to size and general character. A border 3 or 4 rows wide is planted around the plot from the mixed corn left from planting the various rows. This is for the purpose of preventing outside pollination as much as possible and for giving the outside rows exactly the same chance as the others. Careful notes are kept throughout the season of any peculiar or particularly important characteristics shown by each row, such as size of stalk, height of ear, amount and character of the foliage, time of tasseling, time of ripening, number of barren stalks, etc. At the time the tassels appear all stalks which do not show healthy shoots are detasseled to prevent their pollen from fertilizing ears on desirable stalks. Selection for the next year's planting is made in the field that only ears from desirable stalks may be selected. This corn from each row is carefully weighed and the weight finally added to the weight of the remaining corn of the row to get the final yield. Selection for the next year's planting is made from the most desirable ears of the highest yielding rows. It will be seen at once that such a method offers some opportunity for "in-breeding" or "close-pollination" (and by close pollination is meant the fertilization of the ear by a stalk of the same row) since the stalks grown from kernels of a given ear stand side by side in the row. The effect of inbreeding or too close breeding in plants is the same as in animals and is therefore to be avoided. To obviate this danger some stations follow the practice of detasseling every other row and then making a selection for the next year only from the highest yielding detasseled rows. The Illinois station has found a difference in yield of several per cent in favor of the detasseled rows which would indicate that this fear of inbreeding is well grounded. However, a part of this might well be due to the fact that the rows not detasseled were very probably more of them close fertilized, since the rows on either side of them produced no pollen. Experiments have not progressed far enough to give specific data as to this point.

Another method which is being used to some extent is that of planting in blocks instead of in hills, mixing the corn from two desir-

able ears to plant a block from 10 to 15 hills square. The general character and yield of each plot is accurately recorded as in the row method. The idea in this method is to prevent cross pollination, since the mixing of the seed before planting insures quite thorough crossing between the progeny of the two ears planted. The method requires that the land be extremely uniform in character and it does not permit of such accurate data being kept as to individual ears. The method evidently requires considerably more time in developing a particularly desirable strain than the row method.

The breeding of corn for a change in its chemical composition is being conducted at the Illinois station with considerable success, and this work has been receiving no little comment, especially at the hands of writers for popular magazines. The details of this work are quite complicated and only the general method will be mentioned here. It should be stated that it has been found possible to very greatly change the proportions of protein, starch and oil in the grain of a particular variety of corn by a careful selection, accompanied by chemical analysis to indicate the varying proportions of these constituents. Strains have been developed some of which yield over twice as much protein or almost three times the amount of oil as do others, while the starch can be changed accordingly. The breeding plots for this work are arranged after the order of the row method before mentioned, the selection being made largely on the basis of high protein, high oil or high starch, as the case may be, with a fair consideration of yield per acre. It has been found possible in this work to rely partially on a simply physical examination of the grain which lessens considerably the cost of work by decreasing the number of chemical analyses necessary. It has been shown for instance, that the germ contains the greater proportion of the oil and by selecting for large germs a fairly accurate estimate can be made of the proportion of oil in the grain. The protein is very largely contained in the clear or horny starch of the grain so that by selecting ears whose grains show a large proportion of this horny starch there is every probability of getting the high protein ears. It should be noted that while there is some variation in the composition of individual grains on the ear they run fairly uniform on the whole so that the composition is an ear characteristic rather than a characteristic of individual grains and consequently by determining the protein or oil in a few grains from an ear a very accurate indication is given of the total protein or oil content. The means of developing varieties of corn thus varying in composition comes from the fact that for special uses as for feeding, for starch manufacture or for production of corn oil, the corn

can be much enhanced in value for these particular purposes by having its composition fit the requirements, and there now exists a marked demand for varieties of corn having these different characteristics.

It will be understood that whatever system of breeding is followed a propagating field or plot will be provided for growing the seed from the breeding plot in large quantities. This plot is planted with the best of the ears remaining from the choice rows or blocks, as the case may be, after the final selection for the next year's breeding has been made. This plot varies in size from two to several acres and not only furnishes a means of supplying large quantities of the improved seed, but also gives opportunity for testing on a large scale the character and yield of the corn produced in the breeding plot. Various methods are employed regarding the management of this propagating plot, but they differ little in important details. It will readily be seen that such a plot is necessary, that quantities of the seed be produced, and since it is supplied each year from the product on the breeding plot of the previous year it is only one year removed, and the character of the corn will be approximately, that of the breeding plot itself.

The plan of crossing corn by artificial pollination is being practiced at various stations in the process of forming new varieties. The tassels of the stalk which it is desired to use as a male parent and the ear of the female stalk are carefully covered with cloth bags until time for pollination arrives when the pollen from the male is transferred to the silks of the female thus controlling accurately both parents and fertilizing the new ear with pollen from a plant of known characters. The method offers much to scientific corn breeders in the forming of new varieties since it is thus possible to cross two ears of very high protein or oil content or of very high yield, or of very desirable stalks and know that kernels on the young ear will probably each produce plants of characters which blend those of the parents. It will be seen, of course, that this operation is suited to breeders who have time and means to devote to it and is not for the practical man.

Aside from the mere matter of breeding, some of the stations are doing much of a practical nature by disseminating knowledge of the methods of corn improvement among the farmers and encouraging them in every way to take up the matter of improving this cereal. One feature of this work which offers much in Missouri is that of co-operative work between the station and the farmers. This can be made especially practical in the testing the varieties to determine those suited to each locality. It has been abundantly proven that particular soils and localities require particular kinds or varieties of corn for best results

and a great deal of valuable work is being done by the stations in thus aiding the farmers to find the most suitable varieties for their conditions. The encouragement of corn breeding by individual farmers is also being practiced, which is evidently bearing fruit, since a great deal of interest is being shown throughout the corn belt in this matter of corn improvement.

As to the methods and plans of the experiment station which are applicable to use by the practical farmer something might be said. Undoubtedly much will depend upon the skill and intelligence of the farmer as to how far he is able to apply the methods of the experiment stations in his own work. Certainly every farmer of average intelligence who grows corn to any extent can apply some of these principles at least in a slightly modified form. I am convinced that every farmer who is engaged in corn growing would be amply repaid by setting aside a small tract of land, say an acre, on which to grow his seed, and planting this with corn from the 15 best ears he can select from his crop of the year before. This will mean that he will have good ears planted together where they may be closely observed and where fertilization will take place mainly between stalks of desirable character. This will be true even though the plot lies in the center of the field, but it would undoubtedly be much better were the plot located at one edge, preferably on the side toward the prevailing winds, or probably better if it could be isolated from the main body of the field entirely. In any case the soil on which it is grown should be an average in fertility of the rest of the land that the corn developed for seed will be exactly suited to the conditions under which the main field will be grown. I believe further that for our most intelligent and progressive farmers the breeding plot mentioned before where rows are grown from individual ears can be used with success. It is being done in Iowa, Illinois and Ohio to quite a great extent by practical farmers and is by no means impractical for the man who is giving his best attention to the improvement of his corn crop. Lastly, the development of varieties particularly suited to given conditions lies within the province of the farmer's ability. In certain localities we need drought resisting varieties, varieties suited to particularly thin land or very rich land or varieties adapted to various peculiar phases of soils and climate. Careful selection and breeding of corn by the practical farmer will make these things possible and until our farmers appreciate the necessity for care in handling this important crop and the possibilities of changing it by selection to suit his conditions we shall never have the highest development of corn in Missouri. Scientific breeders and experiment stations can do very much but by no

means all. The permanent improvement of corn for the future will depend largely on the skill and intelligence of the farmer himself.

WHAT THE FARMER MAY DO IN CORN IMPROVEMENT.

(Col. G. W. Waters, Canton, Mo.)

This paper on "What the Farmer May Do in Corn Improvement," follows logically Prof. Miller's paper on "What the Experiment Stations are Doing," (and have been doing) in the same line of work. He tells us what has been accomplished by scientific investigation and careful experimentation. It remains for us to inquire in how far the farmer may follow in adopting the methods of the progressive corn breeder.

Assuming that the findings of the experiment stations are correct and that corn is susceptible of great improvement by proper selection and breeding, the subject appeals at once to the farmer as well worthy of his consideration.

The farmer will do one of three things: First, wholly disregard the experiment station work by going on in his own way planting corn grown without reference to improved breeding, taking no advantage of the progress of the times; or, second, he will rely for his seed upon others who grow it more or less upon scientific principles; or, third, he will adopt the up-to-date methods of seed corn growing which have been clearly described in Prof. Miller's paper preceding this.

In many cases it will be the best for farmers to adopt the second method; that is, to secure their seed corn from some responsible grower. There are a number of precautions necessary to be taken in the purchase of seed corn. I will mention some of them:

(a) It should come from somewhere near the same latitude. Corn grown further south would ripen later and probably have a tendency to produce excessive stalk, for it is noticeable that the stalks grow taller as we go southward. Corn from the north would, on the other hand, ripen too early to get the benefit of the entire growing season.

(b) Again, if grown and developed on land entirely different from that where it is to be used, it would probably be disappointing. However, from observation and experience, I conclude that seed corn should be grown on good land and receive good cultivation so as to give the seed great vitality and prepotency toward a profitable yield. Corn will deteriorate and degenerate in the same manner as will live stock if submitted to adverse conditions as to feed and care. I have in mind two fields of corn, both planted with first-class seed of the prize-winning

kind, shown by Mr. Raine of Canton at the State show in St. Louis, February, 1904. One field was good ground, planted in good time and given good cultivation and produced corn true to type and as good as the original. The other field was wet land, planted late and was poorly cultivated. The corn of this field has deteriorated so much that no one would recognize even of what variety it is. While the land should be fertile and of the same general character of the land upon which the seed is to be used, yet it should not be one-sided in its fertility. If too much nitrogen were in it, as would be the case in an old feed lot mentioned by President Laughlin in his annual address, it is probable there would be a tendency to an excess of stalk.

Perhaps the most difficult single problem the farmer has to solve is just what particular type of corn and of what particular origin will be the most proltable corn to plant in any given locality. The Tennessee Experiment Station found by a trial of three years that corn developed on rich bottom land did not produce so well when planted on upland as corn developed on upland, and vice versa. It is true, however, that corn adapts itself to environment and becomes acclimated more readily than any other farm crop. A neighbor near Canton sent north a few years ago for seed corn. The crop the first year was very disappointing. The second season it was larger and better. The third year it grew well, retaining its characteristic form with greatly increased size and yield. It was good enough to afford splendid specimens for the Missouri exhibit at the World's Fair.

In the majority of cases coming under my observation, where farmers have sent off to seedsmen for new and untried varieties which were extravagantly advertised, they have abandoned them the second year, either because the yield was disappointing or it was allowed to become mixed so as to lose the type. But where farmers have secured good seed in the ear of the standard varieties from reliable growers within one hundred miles of their own latitude, they, as a rule, have been well repaid for the expenditure.

In view of the many difficulties and uncertainties attending the plan number two (that of sending away for seed corn), I deem it much the safest and best to adopt the third plan (that of developing and raising one's own seed corn). This may be done, however, to great advantage by the co-operation of a group of farmers in a given community. One member of the association whose farm is suitably located, is selected to grow a single variety, all of the members agreeing to buy their seed from him at a remunerative price, say $1.00 per bushel. This grower, so selected, would be expected, of course, to adopt up-to-date methods

in corn improvement, as well as in handling and caring for the corn. This plan offers many advantages and is being adopted in some localities where we have held institutes. Judiciously carried out, it solves the seed corn problem. The corn thus grown and developed is, or will be perfectly acclimated and adapted to the land and locality. In order to determine which type or variety is best suited to the locality, a number of varieties should be tested. Each farmer should plant several varieties in plats side by side, watch their growth, ascertain their yields and in this manner from a number of such comparisons the very best varieties could be selected for all the farmers of the locality. Of course the corn from these particular plats would be unfit for seed, a variety selecting being the only objective point.

It makes less difference than many suppose, which variety is chosen for ultimate adoption, provided it be bred up in the manner outlined by Prof. Miller. However, it would be best to begin operations with corn already developed to a high standard, and by judicious breeding keep up the standard of excellence, and in addition secure adaptation and acclimatization to the given locality.

In my judgment it will be unwise for the farmer corn breeder to try to develop two or more special traits, but he should strive in the one direction, large yield, for it is a well-known principle in animal breeding and plant breeding as well, that it is easier to develop a single trait or character, than two or more at the same time. It would be better to grow legume crops for the necessary protein, than to try to get it as a special development in corn. If it is true, as suggested by Prof. Miller, that the protein is very largely contained in the horny starch of the grain, it follows that high protein corn is harder, more flinty, and not so easily masticated, and hence not so desirable for cattle feeding, and even may be objectionable on account of its hard, flinty character for other stock. Again, it is best to give animals a greater variety of feeds, no one single feed equaling in efficiency a variety. Another point in growing legume crops for protein, we afford the land a desirable rotation.

The oil content, however, being largely in the germ, it will be well to select corn of large germs, as this development will probably correlate with largeness of yield. Another advantage may be gained by selecting large germs, that is to secure increased vitality. Grains with large germs will send up larger and more vigorous sprouts, (plumules) and start to grow more readily. It has been observed that grains with large germs and thick bodies, somewhat flinty, will germinate and grow under more unfavorable conditions, (as wet, cold weather) than thin gourd seed grains.

Seed corn growing and seed corn selection, presents a many-sided problem. In the work of continuous improvement, or even in keeping up a very high standard of productivity for the whole country, the farmer must do his part. In studying the principles of corn breeding, and in practicing scientific methods, he may not only enjoy increased yields in his crops, but rejoice in his accomplshments, due to careful thought directing his labor. There is a pride and satisfaction that comes to the grower of any product, plant or animal, when he views it, recognizing the fact that its superiority is due to his intelligent management. Nathaniel Hawthorne, in viewing his plants said: "Gazing at them, I felt that by my agency something worth living for had been done. * * They were real and tangible existences which the mind could seize, hold and rejoice in."

DISCUSSION.

Mr. Ellis—There is one practical question I think we should discuss, and that is whether a farmer shall grow his own seed?

Mr. Gabbert—I believe that the seed corn men should have the field and should send out tested seed and we can devote our time to something better. I believe the seed man should have the full field. That is my idea about it and I will buy my seed from him.

Col. Waters—I think that is the tendency now. I find that plan seems to be the most favorable one. At Trenton, in Grundy County, they have an association of corn breeders, but have one, two or three men to raise the seed corn for the whole community. One man might raise the yellow Dent, another the Boone County White and another some other kind.

Mr. Laughlin—I think a man should raise his own seed, adapted to his own kind of land. If you want a peculiar type, you might buy the seed from a pure bred seed raiser, but I think every farm has characteristics of its own, and if you let some other man raise the seed corn you will lose enthusiasm and there is a whole lot in that, and if we would keep up the proper enthusiasm it is necessary that every man should raise his own seed corn and not buy from some one else.

Mr. Ellis—There are some difficulties in the way of the farmer breeding his own corn. The average size farm in Missouri is only one hundred and twenty acres, and perhaps the average corn acreage on that farm is less than thirty acres, and unless one can get the entire neighborhood to grow one kind of corn, he cannot control the breeding of his corn. That is one objection to it. Another objection is that the ordinary farmer cannot become an expert corn breeder because he has

so many other things to look after. On the other hand there is danger of buying your seed corn from a breeder if you get it from a distant place and change its environment too much that it may deteriorate. You might possibly improve it by the change, but can only tell by trial. I think it a good plan for the farmers in a neighborhood to have some intelligent farmer in that neighborhood make experiments with different varieties on the typical neighborhood soil and find out about what variety seems best adapted to that neighborhood. Or let a neighborhood form an association, as they have done at Bunceton or Clarksville—appoint a man to experiment and find out what kind is adapted to that neighborhood and agree to buy the seed from him. Let the man best situated for it and most inclined to breed the corn, be selected.

The average farmer does not try to keep up his cattle by breeding purebreds. He must buy his purebred stock from a breeder. Is it possible for every farmer to devote the same attention to breeding live stock that the breeder does? I do not believe it is. Nor do I believe it is possible for the average farmer to devote the same attention to corn breeding as the expert seed breeder does. I do not believe it is practicable for every farmer to take up this question of corn breeding. If the farmers of the neighborhood will form an association and determine in some way what variety of corn is best adapted to their neighborhood, then grow one kind of corn, or two kinds if necessary, and buy no seed except from the seed grower, it seems to me that that is a practical plan and will keep our varieties practically pure.

Mr. Carroll—Aren't they doing that in St. Charles county?

Mr. Ellis—Yes. The farmers of St. Charles county have developed the St. Charles White variety, and have discouraged the growing of any other variety. I do not think that they have adopted the plan of one man growing the seed.

COMMERCIAL FERTILIZERS AS SUPPLEMENTS TO FARM YARD MANURES AND LEGUMES.

(Dr. H. A. Huston, St. Louis, Mo.)

Crops remove certain things from the soil and these must be replaced if productiveness is to be maintained. If all the crops raised on the farm were fed on the farm, and all the manure returned to the land, the land would, in theory at least, become more productive. The increase would be due to a small amount of nitrogen received from the

rainfall and the minerals rendered more available by natural processes that are always in progress in the soil.

On most farms grain is sold and carries with it considerable plant food. The straw and corn stalks are only partially utilized, and the manures are not handled to the best advantage. About one-half of the plant food in the feeding stuff is contained in the liquid portion of the manure and this is seldom utilized. Fermentation of the manure results in a loss of nitrogen and leaching in a loss of all ingredients, Hence, it happens that even on farms where most of the crops are fed there is a great waste of plant food. Actual investigations conducted on farms that were considered to be well managed, showed that there was a loss of from twenty to fifty per cent of the plant food in the solid part of the manure before it was actually applied to the land. Even where the use of manures is supplemented by clover and other legumes there is still a loss of mineral ingredients. The question then arises whether it is best to purchase plant food after utilizing as completely as possible the manurial resources of the farm.

In most of the territory west of the Mississippi the opinion is frequently expressed that commercial fertilizers are not necessary to supplement the home supply. The progressive farmer does not deal with the other problems of the farm on this basis. If he did he would have no improved live stock, no self-binder, no thrashing machine, and in fact he would have only the simplest implements of agriculture. All these improvements are not necessary. The world got along very well without them until about fifty years ago. They have come into general use because they were found to be profitable. It is not any matter of theory or "it stands to reason" talk. It is a matter of experience. Yet when the farmer is asked to apply to his soil problem, exactly the same principle that he has applied in all other departments of farm work, he shifts his base and thinks it is not necessary, instead of asking "will it pay?"

It certainly will pay you to find out whether you can profitably supplement your farm manures and leguminous crops with commercial plant foods. Why? Because even virgin soils differ greatly in productiveness owing to differences in both physical and chemical condition. The kind and amount of plant food in any soil depends on the origin of the soil and the original growth upon it. A lime stone soil is vastly different from either a drift soil or a peat formation. Starting with a clay soil in its virgin state and utilizing manures and legumes to the utmost would never correct the deficiency of phosphoric acid, which is

characteristic of heavy clays, nor would the same treatment correct the lack of available potash in a true lime stone soil.

Different crops require plant food in different proportions. One of these elements cannot replace the other. A soil that yields fair crops of wheat may need an additional plant food element to produce the best results on corn, potatoes, or clover. Moreover, different crops have different foraging power for plant food. Hence the results of a chemical analysis of a soil are very difficult to interpret.

Another point to remember is that, if you have only enough of any one element, say potash, in an available form, to produce twenty bushels of corn, the crop will be limited to twenty bushels even if there is enough of the other elements in an available form to produce three times this yield. Under the soil skinning processes that have been in vogue on most American farms it has usually happened that the crop producing power has been decreased and frequently this has been by the reduction of the amount of only one or two elements. If phosphoric acid is the one that failed first the condition cannot be most profitably corrected by farm yard manure, because manure is low in phosphoric acid and by using it alone on such land you lose the benefit of the nitrogen, which is its most valuable, abundant and characteristic ingredient. In the same way the use of manure alone on much land or black prairie wastes a lot of nitrogen without fully supplying the deficiency of potash.

By the use of commercial plant foods any element may be increased at will, and both soil differences and crop requirements may be provided for.

Will it pay? Many Missouri farmers evidently think it does pay, for they are using over 30,000 tons of fertilizer per year, and the amount is rapidly increasing. Most of this is on wheat, but experiments conducted in this State during the past season indicate that its use on corn and potatoes will also prove profitable. The first fertilizers introduced into the wheat territory are usually packing house products of good quality, but containing only nitrogen and phosphoric acid.

In the following experiments nitrogen and phosphoric acid were tested against no fertilizer on one side and a complete fertilizer on the other:

EXPERIMENT AT MARIONVILLE, MISSOURI.

(By Mr. William Menogue, On Corn.)

Plat 1, no fertilizer. Yield 20 bushels per acre, mostly nubbins.

Plat 2, fertilizer with 336 lbs. bone and 188 lbs. blood. Yield 29 1-3 bushels of mostly small corn. Fertilizer cost, $8.50, increase worth $4.66; net loss $3.84.

Plat 3, fertilized with the same material as plat 2, and 120 lbs. sulphate of potash, in order to make complete fertilizer. Yield 49 3-5 bushels; all sound corn. Fertilizer cost $11.70; increase of crop was worth $14.80; net gain $3.10. The use of the complete fertilizer converted a loss of $3.84 into a gain of $3.10. The difference in cost was $3.20 and the difference in returns $6.94, a gain of over 200 per cent on the extra money invested.

EXPERIMENT AT OSCEOLA, MISSOURI.

(By Mr. W. M. Love, On Potatoes.)

Plat 1, no fertilizer. Yield 141 bushels.

Plat 2, fertilized with 450 lbs. bone meal and 180 lbs. blood. Yield 157 1-2 bushels. Fertilizer cost $12.57; increase crop sold for $12.37; net loss 20 cents.

Plat 3, fertilized with the same materials as plat 2, and 120 lbs. sulphate of potash, in order to make complete fertilizer. Yield 181 1-2 bushels. Fertilizer cost $16.14; increase of crop worth $25.87; net gain $9.73. The use of the complete fertilizer converted a loss of 20 cents into a gain of $9.73. The difference in the cost was $3.57 and the difference in returns $9.73, a gain of 275 per cent on the extra money invested.

EXPERIMENT AT NEVADA, MISSOURI.

(By Mr. J. D. Morris, Crop Potatoes.)

Plat 1, no fertilizer. Yield 62 1-2 bushels per acre.

Plat 2, fertilized with 600 lbs. acid phosphate and 250 lbs. blood. Yield 85 bushels. Cost $15.00; increase of yield worth $11.25; loss $3.75.

Plat 3, fertilized with the same materials as plat 2, and 200 lbs. sulphate of potash, in order to make complete fertilizer. Yield 199 1-10 bushels per acre. Cost $19.90; increase of yield worth $68.30; profit $48.40. The use of the complete fertilizer converted a loss of $3.75 into a gain of $48.40. The difference in cost was $4.90, and the difference in returns $52.15, a gain of over 1000 per cent on the additional money invested.

These experiments were made on Missouri farms during the past year. The cultivation and other conditions were the same as in ordinary farm practice. They can be duplicated by anyone. You will recall the heavy rainfall of last spring and the difficulty of planting and tending spring crops. Yet very striking and profitable results were obtained.

What do these experiments mean? At first sight one might say that potash was the one thing needed. But this is not the proper interpretation of the results. The bone and blood are materials that are first to appear in the wheat sections and almost always give good returns on wheat for some years, but when used on spring crops they have not always proven profitable. Hence, these experiments were made to compare a partial fertilizer already in common use with a complete fertilizer. In these experiments the partial fertilizer was used at a loss, while the complete fertilizer converted this loss into a handsome profit.

These plain facts are presented, not for advertising purposes, but with a view to calling attention to the desirability of testing your soils and to the necessity of using complete fertilizers made from the standard materials in the proper proportions in making these simple tests. Of course, a more elaborate system of tests can be made in which the results show just what plant foods are needed, but in a section where the fertilizer question is not well understood the farmer wants first to know whether any fertilizer will be profitable, and to arrive at this knowledge with the least possible trouble. Once he has found that the complete fertilizer is profitable he is quite willing to experiment further to see if all the ingredients are profitable.

It will be noted that the quantities per acre are larger than the wheat farmers are accustomed to use, and that the cost per acre is also high, from $12 to $20. Yet the increase in yield paid for the fertilizer and gave a handsome profit on the money invested. The lowest profit was 21 per cent, and the highest 243 per cent on the money invested. The highest per cent of profit was on the highest expenditure per acre. However, we must bear in mind that there is a limit beyond which profits begin to be reduced. This depends upon the kind of crop and the condition of the land. The wheat crop limit would be much lower than that for potatoes or fruit. The better the land the greater the amount of fertilizer that can be profitably used upon it. This is because poor lands generally have such bad physical conditions that they do not retain enough water to mature a maximum crop, even when the other plant foods are suppliel in abundance.

The question of the use of commercial plant foods is well worthy of your attention. It will pay you to find out whether you can use one or more of them profitably. To find this out, use known quantities of high grade plant foods. Having found out what is needed, buy what you need without regard to what the agent may try to sell you. High

grade fertilizers are the cheapest. The two things that keep up the price of plant food in mixed fertilizers are the long credits asked by the farmers and the demand that fertilizers be sold at a low price per ton. The longer the credit and the lower the price per ton the higher is the cost per pound of real plant food in the fertilizer.

I have only spoken in general terms because the subject is too large to be treated otherwise in so brief a time. The matter of the composition of fertilizers for different crops under average conditions, the characteristic needs of the different kinds of soils, the time and the manner of applying fertilizers, are all questions that at once arise after we have learned that they can be used at a profit.

If I can render you any assistance along these lines, I shall be glad to do so.

DISCUSSION.

Col. Waters—Would you put your corn fertilizer in the hill?

Dr. Huston—No, because it is too heavy and you are liable to decrease the germinating power of your corn and when the dry weather comes, it will have no power of resistance. The average corn raiser who uses a hundred pounds of fertilizer to the acre thinks he is doing a pretty good business in putting it in the hill. But some experments I conducted five or six years ago showed whether the fertilizer was drilled in with the corn or dropped in the hill. Up to the time we laid the corn by, that corn where the fertilizer was dropped in the hill was quite in advance of the other corn—that is, where it was broadcast—yet when we came to harvest and weigh it—I assume that you raise your corn for pounds and not for stalks—we had gained one bushel where we applied it in the hill and ten bushels where we broadcasted it.

Mr. Ellis—If you had a very poor piece of land that you wanted to improve, would you recommend plowing under a green crop to begin with before you began using a commercial fertilizer?

Dr. Huston—It would depend upon what stage the land was in. I believe for bringing up your lands, if you raise wheat, the place to begin is on your wheat crop with a fertilizer. Take, for instance, the Marionville experiment. You would not get much more wheat with the 120 pounds of sulphate of potash, but you should follow that wheat with clover. The wheat fertilizers, if followed with grass and clover ought to bring up the land.

You may reduce the nitrogen in your corn fertilizer, and as the nitrogen is the most expensive, you may split your bill in two by putting in a leguminous crop.

Mr. Laughlin—There is some corn on exhibit here on which the farmer used different amounts of fertilizers, and he found a hundred pounds did as well as three hundred pounds—but the fertilized corn kept on growing all the time, while that not fertilized turned yellow. The fertilizer was planted in the hill.

Dr. Huston—If he had broadcasted a part of the fertilizer, his increased fertilizer expenditure would have been profitable. In the latter part of the season, when you did not have so much water, probably these plants suffered from lack of water and could not use the additional amount of fertilizer. If it had partly been broadcasted, they could have utilized it.

There is a great deal to be learned in regard to the methods of application, and while you do not get as striking results, I believe, after twenty-five years' experience you get *more corn* by broadcasting the fertilizer, and that is what we are after.

Mr. Laughlin—I would like to ask what kind of a machine you use in broadcasting.

Dr. Huston—We do it with the wheat drill. Broadcast immediately after you plow, before you harrow.

Mr. Boles—I have heard that if you continue to use a fertilizer, it kills the ground.

Dr. Huston—I am glad you spoke of that. Ever since 1884 I have had charge of the fertilizer business in Indiana, something over a million tons have pased through our office. I have had occasion to visit practically every county in the State and always inquired about those lands which had been damaged by the use of fertilizers and they were always in the next county.

There is an immoderate use of fertilizers which may do you damage. It is a substitution of commercial fertilizers for farm yard manure instead of using the commercial fertilizer as a supplement that does the damage. I can point to a great deal of land which has been damaged by continual wheat sowing or corn growing. Our fertilizer furnishes only a small amount of nitrogen. By the continual planting of one crop you remove a dozen elements of plant food from this land and you put back one. This one cannot be substituted for the other eleven and I do not think it would take you long to figure that the withdrawal of twelve elements from your soil and the return of one is bound to get your land out of balance. This is the reason we hear of commercial fertilizers injuring the land. They are not properly used. The damage has come in making them a substitute for barnyard manures. On nothing outside of market gardening can that be done with economy.

INDIAN CORN—FROM A PRACTICAL FARMER'S POINT OF VIEW.

(P. E. Crabtree, Hannon, Mo.)

There is much more in corn growing than merely the consideration of dollars and cents involved therein. From the very nature of the plant, its pliability, the elasticity of its habits and requirements under varied conditions, it offers a most interesting field of conquest to the ambition of an energetic person through the realization of improvement in habits and development in features pertaining to its growing period, and the final victory of achievement in the nature of shelled corn passed over the scales.

I will touch briefly on some of the essentials of successful corn growing and I will ask the audience to bear with me should some of my experiences not coincide with yours, and will state that my place of operation and my field of observation is located in the southwestern quarter of the State of Missouri. My work has been carried on exclusively on a light, sandy soil that does not naturally produce clover or even nourish it when planted. However, the cow pea is a leguminous plant to which our soil bids welcome.

Fertility.—I will only touch lightly on this subject, as it is more properly covered in another lecture. Suffice it to say that the richer the soil the better, up to the point where the corn plant shows a tendency to sucker and to produce smut, then desist in further supply of fertility except in the way of replenishment. Do not, however, lose an opporunity to constantly add humus, in some form, to the soil, and thus keep it loose and friable, that moisture may be retained from one shower to another, and thus hold the available fertility in soluble form constantly.

Soil Preparation.—Although the "early bird" story is usually applicable to the matter of planting corn, one should not stir the soil when muddy. It is worse than time lost, as it interferes very materially with the tending of the crop later in the season. Plow as early in the season as it is possible to find the soil in the proper condition for stirring. Plow moderately deep and do a good smooth job, seeing to it that it is all cut and turned. Fall plowing is still better in this locality where such is possible, but at any rate the plowing should invariably be done long enough before cropping time to permit a few good soaking rains to settle and firm it as much as possible—the more the better at the bottom of the furrow.

At the first germination of weed seed in the spring the plowed ground should be double-disced. In doubling in this manner do so by over-lapping the disc one-half and thus the ground is left with a level surface. Ten days should now be given for the germination of weed seed then double-disc again, then with a spike tooth harrow, work the ground once at an angle, then double-harrow the way the rows are to be run, and the field is ready for planting. This, to some, will seem excessive tillage of the soil previous to planting, but I feel well repaid for such work later, in the absence of weeds, in the better condition of the soil for the first cultivation, and in the additional plant food thus liberated by such tillage.

Planting.—Experience and observation have taught me that there are two mistakes pretty generally made in the planting of corn. One is to plant too thickly, the other to rely somewhat on replanting done by hand or otherwise where hills are missing. In regard to the former, my plan is to plant both rows and hills as close together as I can conveniently work them with a two-horse cultivator, then put just two grains to the hill. As to the latter, I do not inter-replant. If the stand is too poor, disc and plant over. My planter is set to plant the rows 3 feet, 4 inches apart, and I use a 3-foot, 6-inch wire. I have done some careful experimenting in regard to checking versus drilling. I advise checking, and in no instance to drill, unless your rows run north and south, so that the sun will at least warm the soil once each day.

I find that the trouble of corn being planted too thickly does not come from a lack of plant food to nourish it, as is generally supposed, for that we can supply, but it lies in the plants shading themselves and the ground, thus robbing themselves of the heat, sunlight and air. I endeavor to plant an average depth of 2¼ inches, varying deeper if the ground is light and dry, and shallow if the ground be damp and cold. I use an edge drop planter with attachment for commercial fertilizer, and after repeatedly experimenting have settled on checking 100 pounds per acre or drilling 150 pounds per acre of the fertilizer. A larger amount is at a larger cost, and also produces corn coarser and more irregular in grain, and a much larger amount produces suckers and smut.

Cultivation.—A farmer does not always get just what he wants, but, weather permitting, I always want my corn cultivated just four times, no more, no less, and am very particular about how it is done; preferring to do it myself.

You will know from what I have said on tilth of the soil before planting that I can cultivate it very young. I use a six shovel riding

cultivator, and for the first cultivation, remove the shovels next the row, replacing them with bull tongues. Cultivate deep and close this time in preparation of staying at respectable distance thereafter. The first cultivation once properly accomplished, the farmer has his own way for the three later cultivations. Cross the field at the second cultivation and do not ridge it more than you are compelled to, staying a moderate distance from the row, and not cutting too deeply. Cultivate as planted the third time, stay well away from the row and cut shallow. Ridge no more than compelled to by weeds. Now, as to the fourth and last cultivation use the warped shovels next the row ridging somewhat, but keep well away from the plants, cultivating shallow to avoid severe root-pruning.

Type of Corn.—I deem it improper for me at this time and place to remark on the varieties of corn, so will refer interested ones to my exhibit to verify the feasibility of a farmer producing the type of corn which he champions, and which he finds most remunerative. We know full well that it is not advisable to expect the best results from corn that has lately undergone a very marked change either in latitude or altitude. This being true I advise home growing of seed corn so far as it is practicable. Of course if one has not already a thoroughbred corn of really high producing capacity, get it first, get it as near home as possible, then proceed to make it better and of a higher producing capacity each year I know that this line of work is sadly neglected by farmers in general. I also know there are so many features of the corn plant entirely undeterminable in the show room and at fairs, in short, by examination of the ear, that play a very important part if the ability of a variety to produce a really heavy crop of sound, merchantable shelled corn, that farmers often get hold of a variety of high exhibition quality corn that proves to be a really light cropper of sound corn.

The reason is obvious. The ear that is of the prescribed conformation wins, and is used for breeding stock regardless of field conditions surrounding it. That is why I advocate field selection of the seed always. Keep it up and make producing capacity your watchword.

After securing the corn that will yield properly, raise your own seed and in so doing select it in a manner to conform with your ideal of a perfect corn, considered from a utility point of view. Although the farmer may at times show an exhibit of corn, that is a secondary consideration with him and his profits lie in what he cribs and not what he shows. Now let no one understand me to wish to discourage corn shows. Far from it, I strongly favor them as a stimulant to endeavor, but I place utility above fancy points, and advise that the enterprising farmers

of every neighborhood ascertain by trial the very heaviest cropping corn possible to secure in that particular locality, and once having secured it "hold fast to that which is good." If it deviates too severely from the prescribed standards and score cards, make one calculated to fit it, including anticipated improvements, and hold local shows, invite good-natured friendly rivalry, and have good and profitable meetings.

Exclusive of Score Card.—Granting now that the farmer is really getting interested in his work and has determined to raise his seed corn, I will outline his procedure in field selection:

Do not be misled into selecting the biggest, loosest ears in the field for seed. Invariably the very largest ears have the largest cobs, and are also slower in maturing as well as shelling out a poor percentage. The aim should be rather to eliminate nubbins and barren stalks, secure a moderate, quick developer for this locality, select a type neither too flint nor too dent, but sufficiently hard to mature in a marketable condition, solid, compact, bright in color, and flint enough to have a good woody stalk, stiff enough to support its burden and stand erect all winter if necessary. The stalk should be short-jointed, thus insuring good leafage, medium height, tapering from the ground to the top rapidly, and should carry the ears uniformly in height, varying in strength of soil and seasonable conditions, from waist high to chin high. Secure the heaviest system of brace-roots possible. A single stalk has been known to adhere 97 pounds of soil, the brace-root producing a perfect mesh of feeding rootlets. I find that the brace-roots have much to do with the yield. Do not select seed from stalks producing two ears. Such corn plants are retrograding toward whence they came, to that extent. The single ear stalk produces the largest weight of shelled corn and is the heaviest yielder, also the double-eared stalk more than doubles the husking bill, which in this locality is 3 cents per bushel. With all these things taken into consideration you have taken the necessary precaution regarding one of the parent stalks of your seed ear. Remember the stalk on which the ear grows is always the female parent of the said ear, and of all the grains thereon. Also remember that in the general fields the chances are against its being the male parent of more than perhaps 20 per cent of the grains of the ear, the rest probably being fertilized by pollen from the tassels of other stalks, which accounts for it taking continued, persistent effort in the direction of line-breeding to produce what we desire.

Now to be reasonably sure as to the merit of the male parent of your seed ear it is necessary to see to that the seed ear comes from a stalk, the hill of which contained no stalk with seriously objectionable

ear, and also that the same degree of merit extended to the four hills surrounding the one from whence came the seed ear. Even then we have no positive proof that every grain which the ear contains is a well-bred germ, but we do know that a big majority of them are, and I find that this plan of field selection carried out for a few years will simply work out surprising results in the nature of preferred type, and especially in producing capacity. As an example of the latter I mention that I well remember some years ago it was generally believed that forty bushels per acre was an outside limit in corn production on this thin soil. I was repeatedly told as much when I attempted to surpass it. But I had to "be shown." Time and effort have furnished me with some data on this matter. In 1902 I measured off what I considered my best acre, and it weighed out 82 bushels and 25 pounds. I then adopted the plan of annually measuring a small portion, the best of each field, and weighing it for my own information and as a check on all new varieties tried. In 1903 the best produced at the rate of 100 bushels and 67 pounds per acre. In 1904 the best produced at the rate of 158 bushels and 45 pounds. As to the various fields the past season the best of one, made at the rate of 97 bushels and 10 pounds. Another 129 bushels and 50 pounds, another 158 bushels and 45 pounds. I hope the end is not yet for I am not the person who will not try to surpass it another year.

I advise all farmers to begin at once and produce their own seed corn from a good beginning in the manner herein prescribed, and if they will but do so the printing of statistics relative to the yield of the corn belt will necessitate the use of much additional type.

I referred to the matter of checking upon other breeds of corn. I have generally given trial to about five varieties per year, and I usually find that the corn handled as above produces from ½ to 2½ times the yield, under some conditions, as does the new varieties.

Fertilizers.—We will grant that the various kinds of fertilizers containing nitrogen, phosphoric acid and potash in the proportion required by corn, and likewise similarly available should, in theory, be about of equal value. However, after experimenting with seven kinds and compounding two home-mixed formulas I greatly prefer the packing house product. All farm manures should be utilized both for the plant food and for the humus they contain, but I find that in addition to all those, it is a great help in the cultivation of a corn crop to give it additional plant food in the hill and force it above weeds that surround it, thus enabling one to properly accomplish the first cultivation.

The Score Card.—For the judging of corn, as also all other judg-

ing by score card, the card has its uses and abuses. The card furnishes a record of the judge's opinion, if he has one, and if he has not it reveals the fact. In show room work I prefer the use of the card only where the judge has become expert in its use. In the case of ninety-eight judges who have come under my personal observation in the use of score cards on animals, I found that few of them worked with a degree of accuracy, that their variation in test work where the same animals were repeated on them in an irregular and puzzling manner so as to defeat any effort, whatever, at memorizing, and to compel them to rely solely on the merit of honest estimate of the various specific requirements of the animals, amounted to a variation of 1-8 of one per cent. No one can claim for any system of judging that no variation whatever, of a person's estimate occurs, and I firmly believe that a correct card properly used will produce results more accurate than is possible by any other system of judging. Please do not understand me to affirm that no variation occurs in score card work; but I do contend that the same judge on the same specimens would do more inaccurate and consequently more varying work without the card than with it, granting that he be equally experienced in the two methods of judging. The simple truth is that without the card his errors are never revealed, while with it, he goes on record in every detail, and from the fact that the mathematical estimate of outs sometimes falling between 1-4 and ½, or whatever the case may be, the slight variation would, at times, occur and would show against the judge, were the specimen being shown repeated on the judge. Thus it is that the argument against the score card judge on account of an occasional variation in the test work, and in favor of the comparison judge, where his shortcomings are not recorded, finally narrows the matter down with the exhibitor to the consoling stage of mind that "ignorance is bliss."

But to lay aside all preferences for or against the score card as a means of judging corn, I have a much greater, more constant and more beneficial use for it as a handy means of carrying, in condensed and well grouped form, the standard values and specific requirements of corn for seed and for market purposes, but particularly in that a reference to the card occasionally calls my attention to any oversight that I might make, and it is for this purpose that I find the card of incalculable value.

I believe that a score card similar to the following one should hang above every farmer's desk, to be used as a breeding directory in the selection of his seed corn, and that great good would result from such a practice. I present herewith a score card I have worked out for my own use.

Southern Missouri:

*SCORE CARD FOR CORN.

Name ....

Owner's address ....

Entry No...................... Variety......................... Breed.........................

Official. { Length of ear, 11 inches. Circumference of ear, 8¼ inches. Proportion of corn to ear, 80 per cent.

An exhibit consists of not less than ten ears.

		Value.	Outs.
Class Entered		....	....
Number Ears Entered		....	....
Uniformity	Of Ears	5	....
	Of Body Grains	5	....
	Of Tip Grains	5	....
	Of Butt Grains	5	....
	Of Surface	5	....
Shape	Of Ear Proper	5	....
	Of Tips	5	....
	Of Butts	5	....
	Of Rows	5	....
Color	Of Cob	5	....
	Of Grain	5	....
	Foreign Grains	5	....
Size	Length	5	....
	Circumference	5	....
Absence of Furrows		5	....
Depth of Grain		5	....
Solidity, Firmness		5	....
Marketable Condition		5	....
Proportion of Corn to the Ear		10	....
Total Value		100	....

Total Outs..

Score of exhibit..

President ....

Secretary ....

...., Judge.

Deserve More Strict Attention.—As I see it, the things that at present are deserving of more strict attention in the matter of corn selection follow. I regard them in importance, in the order named:

Producing Capacity.

Marketable Condition.

Uniformity of Grain.

Proportion of Corn to Ear.

Size of Germ.

Most Common Errors.—I regard the following as the errors most commonly made by corn growers whose methods have come under my observation:

Tilling the soil when muddy.

*The above score card is one used by Mr. Crabtree and is not printed here as the standard for Missouri, but is printed for study and comparison.—Editor.

Failure to properly assort the seed corn into two sizes, namely, large and small.

It is no extra trouble for me to shell an ear off into two pails instead of one. I first butt and tip the seed ear then proceed to shell, and more often a part of it shells as large seed and a part as small. The proportion often ranges from one-third to two-thirds as the point of distinction. Now there are two reasons for this. It sometimes occurs that we have occasion to change planter plates as a consequence of the difference in size of the seed, but there is a much more important reason. The larger the grain in a hill the larger and stronger plant it will grow. The difference in the young plant is greater and continues to be more noticeable as they grow older. On examination one will find that the larger plants are robbing the smaller ones of sunlight and air above ground, and that their roots are far outreaching them in the soil, and robbing them of their fertility. They can never hope to catch up and thus is enacted one of the most fruitful sources of nubbins. It is similar to feeding calves and grown cattle together. Plant the seed graded as large, first, and when that is gone plant that graded as small. The stalks in the hill of either will run uniform in size and all will thrive well.

Another error is in selecting long-jointed, top-heavy stalks with the ear set too high, from which to save seed. Another is the selection of a variety too dent and soft to mature soundly, but inclined to mold fast to the husk and rot before drying. Another is to throw too great stress on the importance of having the tip of cob entirely covered, resulting in a concession on the part of yielding capacity, and producing a corn of short cob, one that shells out a handsome proportion of corn to ear, but one that is a really light cropper.

If anyone is of the opinion that each of the things mentioned do not play an important part in corn production it would be worth their while to visit a farm where those things are considered in the growing season. After visiting such corn fields an old gentleman of perceptive ability and discrimination once said to others, "I tell you the county could well afford to pay the owner of that farm a thousand dollars a year to go around and tell the farmers how to raise corn." The remark was criticised as the product of a fertile imagination by one who had a reputation for annually raising the poorest corn in that locality, whereupon the old man retorted, "I mean it. I am not joking. The county could never make another equally good investment." Thus it is that what one sees another sees not. What one does another does not.

Over Populated.—Some entertain fears lest the corn belt region will soon become over populated. Many years ago the majority of the

pioneers in this part of the State thought they had "corned" the land to death and sold out and left the country. Today under intelligent management and with proper treatment those same old farms are producing crops of corn that would amaze the old-timers. Let us welcome the day when a more intensive cultivation, intellectually applied will make the corn belt bloom as never before. I have stood on the banks of the Humber river in England, where the soil has been continuously cropped for centuries, and in estimating the tremendous garden crops that were there being produced I could but think of the folly of some of us of the corn belt region of America cherishing the idea that it is necessary, under proper management, to wear out a farm and move on every fifteen years. I believe that American agriculture is still in its infancy. I believe that the time will come when we will not only know how to double or treble our annual yields per acre, but also how to care for the fertility of our soil as well; when we will be as well prepared to utilize the valuable land which we possess as are the inhabitants of the old countries. Such will be accomplished largely I think through interesting the boys and young men of the country in an agricultural education.

The Institute.—Let me say a word here in favor of the commendable work now being done by our State Board of Agriculture. The Farmers' Institute and the display car of products are working closer into the confidence of the older farmers than ever before. They have made a deep impression on many of the younger farmers, who are already beginning to take hold. They carry out their educational work in a manner that is readily grasped by the students of the public school, and never fail to say a good word for the work being accomplished by the Agricultural College.

Recently one of those institute meetings was held for us at Liberal, Missouri. The Liberal schools were dismissed in the afternoon for the occasion, and the interest shown by the students was intense. The young ladies were equally interested in the lectures, especially pleased with the contents of the display car, and many students expressed a desire to, at some time, succeed in attending the Agricultural College, and devoting themselves in that direction.

That is what is wanted. A stimulus to the ambition of the youth of the land in an agricultural direction, for let it be understood that a person never achieves anything which they have no ambition for. If a man has not an ambition to drive the best team in the county he will never drive it. If he has no ambition to raise the biggest crop of corn in the State he will never raise it. If he has not an ambition to accom-

plish something he will never accomplish it. Ambition must precede the accomplishment. Cause must precede the effect. No cause, no effect.

The recent lecture of the President of the Missouri Corn Growers' Association at Liberal is already bearing fruit and more work in that line is now craved by the farmers.

CORN POLLINATION.

(H. S. Reed, Agricultural College, University of Missouri.)

We do not usually think of the corn plant as having flowers, as our ordinary flowering plants have; it is only when we find that it has the same floral organs that we come to the conclusion that the corn really belongs to the flowering plants. We know that our ordinary flowers have, in the center of the flower, one or more organs which are somewhat rough or sticky on the upper end, which we know as pistils. Surrounding these we have a circle of filaments which are yellow on the ends and if we stick our finger into the flower, we withdraw it covered with a yellow powder which is the pollen. We know that in order to have fruit such a flower must be pollinated; i. e. this yellow pollen from the stamens must by some means be brought upon the end of the stigma, and when it is brought there it brings about fertilization and the act of transferring the pollen from the end of the stamens to the pistil is what we know as pollination.

In flowers of the apple or lily type, we have a different kind of flower from that of corn, because in them we have the stamens and the stigmas all in the same flower, while in corn they are separated. When a bee alights on the apple or lily blossom and searches for honey he is pretty sure to rub his head on the stamens and then rub some of the pollen on the stigma and so pollination is brought about. As the bee goes from one flower to another it carries some pollen on its body and thus a flower may be pollinated by pollen from another flower. This brings about cross pollination. If a flower is pollinated with its own flower, we say it is self pollinated.

As long as one hundred and ten years ago it was noticed that many flowers had adaptations to prevent being pollinated by their own pollen. In a very curious old book which was published at that time, the author said that Nature seemed to have intended that no flower should be pollinated by its own pollen, but rather by the pollen from another flower of the same species.

Now there are, if we begin to examine them, a great many causes which prevent this self pollination and they do prevent it very effectually. One is by having the pollen ripen at a different time from that in which the pistils are ripe, so that when the pollen is ripe the pistils cannot be fertilized and the pollen must be taken to some other flower and when the pistils are ripe they must be pollinated from some other flower because their pollen is all gone. Another way is by having the stamens some distance from the pistil so that when carried by wind or insects, the chances are small that the pollen will get from the stamens to the pistil of flowers on the same plant. In corn we have the stamens removed a long distance from the pistil because in the corn the stamens are the "tassel," and the pistils are the "silks." You have seen a yellow powder shaking off from the tassels when the wind is blowing. It sifts down and the wind carries it along and some of it is sifted on parts of the plants below. This powder is the pollen. Insects do not aid in carrying the pollen of the corn, it depends upon the wind. The silks are connected with what later come to be kernels, so that in the corn we have a mammoth pistil with a very long drawn out filament which is rough or sticky at the end and which gets its pollen sifted down from the tassels. Now if we could take this and examine it under a microscope at this time, we should see something interesting going on. The pollen, lighting on the end of the silk, grows out into a tube which carries a cell-nucleus down the silk to where the kernel forms later on and this accomplishes the fertilization.

The whole structure of the corn plant is one which almost entirely prevents self-pollination. The chances are greater that the silk will be dusted by pollen from another corn stalk than by its own, and I may say here that even if it should be pollinated by pollen from its own stalk, that the pollen from its neighbor would germinate quicker and outrun its own pollen growth. Corn is essentially a cross-pollinating plant. This fact has some very distinct advantages. I was not able to find the data on the effects of cross-fertilization in corn, but I found other data which will show what I want to say equally as well.

Chas. Darwin in his study of cross and self-fertilization has left us valuable records of experiments that he carried on. Here is one with the common Morning Glory. He raised his plants in a green house where he could cover them with a fine net, keeping out all insects, and did the work of pollination with a brush. He pollinated some with the pollen of other plants and some with their own pollen. The first generation the cross-pollinated plants had an average height of 86 inches and the self-pollinated plants of 65 inches, or in the proportion of 100 to

76. He saved the seed from these plants, planted them and carried on the same pollination process, and in the second generation the cross-pollinated plants average 85 inches, while the self-pollinated plants averaged 66 inches, or a ratio of 100 to 79. In every case the cross-pollinated plants were taller and more vigorous than those which had been raised from seed pollinated by its own pollen. Now the difference was not due to one or two unusually tall individuals which brought up the average. The difference was due to every plant being larger than the corresponding plant from the self-pollinated seed.

Again he carried on some experiments with carnations on the effect of cross-pollination and also the effect of self-pollination. He had three lots, one which had grown in his own garden and were pollinated from flowers brought from London, another lot was pollinated from other individuals grown in the same garden and the third lot was pollinated from its own flowers. So we have what he calls the London crossed, the inter-crossed and the self-fertilized plants. In comparing the London crossed with the self-pollinated, we have the greatest difference, the average height was in the ratio of 100 to 81, the weight of seed in the ratio of 100 to 33. The ratio of the London crossed to the inter-crossed, that is, the relation of those crossed with a new stock to those crossed by their own brothers and sisters, was 100 to 45 and the weight of seeds the same. The ratio of the inter-crossed to the self-fertilized was 100 to 67 and the ratio of the weight of seeds 100 to 73.

This plainly shows one or two things. First, there is an advantage in crossing from a fresh stock. It gives new vigor. Second, the gain in the weight of seed is greater than in the height or general vigor of the plant and further shows that the plants which were cross-pollinated even with their own stock were more vigorous and produced more seed than those which were self-fertilized. So we can appreciate to some extent the value of cross-pollination in the corn.

Now as a result of this crossing, we sometimes get undesirable things in our fields, that is especially true where we are raising corn for seed purposes. These considerations should teach us that we must be very careful about keeping our seed plat some distance from other corn if we want it to be vigorous and hardy. It is as important to pay attention to the plant which bears the pollen as to the plant which bears the ear, because the offspring is as likely to inherit the characteristics of one as the other. To guard against this possibility, we must use great care as to where the pollen comes from and the best thing to do when the corn is ready for pollination is to go through the patch and cut off all the tassels on weak stalks so that the pollen will come only from the

strong stalks, true to the type which we wish to raise. Then we must have our corn some distance from any other field because the pollen may be carried sometimes one-fourth of a mile by the wind and this accounts for our getting ears in our corn containing colors and characteristics which are not in the regular crop. People are at a loss to know where they come from. They come from some adjoining field the characteristics of which are brought by the pollen.

This also has bearing on the question of running out. Many corn growers think that they can only raise corn from a certain strain for a number of years and must then go or send elsewhere for a new strain because the old one has "run out." There is really no such thing as "running out." It would be better to say it is carelessness in allowing the corn to be pollinated by pollen from any kind of corn. If the corn is selected—that is, if the tassels are weeded out before they shed their pollen and care is taken to prevent mixtures from worthless kinds of corn, the corn is in no danger of deteriorating or running out. In this way the corn is not only kept up but improved from year to year.

DISCUSSION.

Col. Waters—(Holding up some ears). Here is the pure white corn. Here is the detasseled corn and here is the first cross.

Mr. Reed—It has just begun to be recognized that the characteristics of both the parents are not always transmitted. We may have for instance a white and a yellow corn and after allowing them to cross we may get seed which is entirely white, or we may get seed which is entirely yellow, or we may get a mixture of the two. Now suppose we had crossed the white and yellow corn and the seed from that cross was all white. We plant that corn and the corn which we raise from that seed may be part white and part yellow. It is due to what is called the dominance of characteristics that the white character was dominant in the first generation, but it might not be dominant in the next generation, that is, the next generation may resemble the grandparents without resembling the immediate parents.

Mr. Kurtz—We have a type of corn in our county but the great objection to it is that the ear is too small. But when we put it on the scales it is as big as anybody's. I thought that by crossing we might increase the size of the ear. I planted an ear of white and an ear of yellow side by side. I took the tassels out of the white and made the first cross. How many crosses will we have to make to increase the size of the ear without losing any of its good qualities?

Mr. Reed—Such things occasionally come the first time as a result

of what we call a sport, but more frequently and in the cases where the most valuable changes are brought about, they are brought about slowly from year to year. There is a little increase each year and by selecting the largest ear or the one closest to the type from year to year we can increase the variation or fix the characteristics.

Col. Waters—You mean simply by selection?

Mr. Reed—By selecting the materials for crossing.

Col. Waters—We could get a better result by selecting larger ears.

Mr. Kurtz—My idea was to keep on—to get the length of the yellow corn without losing any of the good qualities of the white corn.

Mr. Reed—The longer that is kept up, the more you can select and the greater the size you can bring about. You may perhaps never get the white corn to the size of the yellow corn, but you may get the desirable characteristics of the yellow corn.

Mr. McFarland—If I was going to make a cross I would use two different types of yellow corn. The experiments in the different colors would show what I could do, but if I wished to make a cross I would use two different types of yellow corn.

Mr. Ellis—Would it not be more desirable to increase the size by selection than by crossing?

Mr. Reed—The size can be increased by selection of the largest ears from a particular variety but it is a question whether it can be profitably done in this way.

Mr. Ellis—When you begin crossing you lose your strain and have to begin all over again.

Mr. Reed—That is simply what every breeder of pure bred seed corn is trying to do.

Mr. Ellis—I do not think so. No breeder of Hereford cattle, for instance, would think of going outside of his breed for improvement, but would hunt for the best blood among the Herefords. If he wanted to establish a new or distinct breed, he would do it by crossing. If there is such a thing as heredity in plants, then the purer we keep the strain we are breeding, the stronger the prepotency of that strain and the more certain can we control the performance of the plant. I do not understand how we are to establish a pedigree for a variety of corn if we continue to cross it with other varieties. Will it not be better to look for stronger blood in the same variety and keep the strain pure than to introduce outside blood and lose our pedigree?

Mr. Reed—Of course, if a man insists on keeping up a pedigree, he can only improve his variety by selection; but if he is anxious to change some characteristic (such as length of ear or weight) he will get wider

variations by crossing with another strain than by inbreeding and selection. For this reason I think Mr. Kurtz will increase the length of the white corn faster by crossing and selection than by inbreeding and selection.

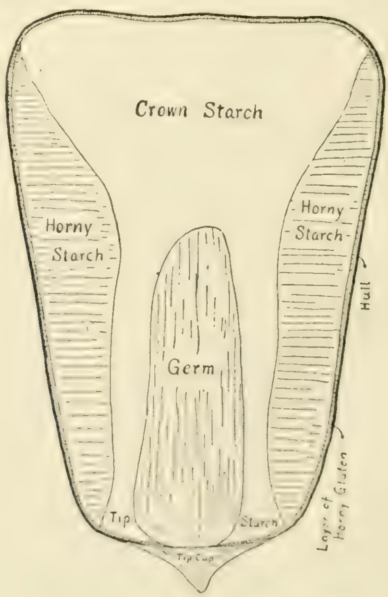
Mr. Ellis—Variation is just the thing we want to avoid and trueness to type is the thing most desired, and for that reason we had better keep our variety pure and we will then have a reasonable assurance that the good qualities of the parent will be reproduced.

THE CHEMISTRY OF CORN.

(Dr. R. M. Bird. Agricultural College.)

In speaking to an audience upon a chemical subject great difficulties are met with by reason of the fact that chemistry demands the use of a large number of technical terms of which the average man would not be expected to know the meaning; and futhermore, the subject is so extremely broad that it is well nigh impossible to make much out of it during the few minutes which are allowed me this evening. Therefore, I shall attempt to deal with a very few compounds that occur in the corn and a very few processes which go on during the period of growth. Only the high places can be touched, and these very lightly.

The corn plant is a machine of the most delicate and complicated construction by means of which the farmer transforms certain raw



PARTS OF GRAIN OF CORN.

materials into certain finished products. His raw materials are the carbonic acid of the air and the water and mineral substances from the earth, and his finished product is starch, oil and protein. These are the principal compounds which occur in the kernel of corn and for which the farmer works from seed-time to harvest. Nature is a wonderful chemist and works in a very small laboratory, but she has many of them. These laboratories are the plant cells; they are in the stems, the leaves and the grain. The carbon, the hydrogen, the oxygen, those elements of which the plant needs most, together with nitrogen, phosphoric acid and potash are transformed into compounds totally unlike those originally fed into the machine. The carbon is breathed in by the leaf cell as carbonic acid gas, and the water comes up from the ground and brings with it the mineral constituents. If you were to look at the leaf of the corn plant under a microscope, those particles of green which make the whole appear green to the eye would become separated one from another. These green "corpuscles" called chlorophyll corpuscles, are the places wherein the carbonic acid gas is split up and where starch first appears. But starch cannot pass through the walls of these small cells and reach the ear of corn, and therefore Nature changes it into a compound near akin to sugar which will dissolve in the juices of the plant and be carried from the leaf to the grain. Likewise those compounds of carbon, oxygen, hydrogen and nitrogen, known as proteids, which are likewise formed in the leaf cells are transformed into soluble compounds and journey along with the sugar-like bodies to the kernel, where they are transformed into proteid matter again. The sap of a plant is a water solution of these sugar-like and nitrogen-containing materials together with certain other things and it is by means of the sap-flow that the products formed in one part of a plant are carried to that part from which they are harvested.

If you were to take a grain of corn and soak it in hot water for about thirty minutes, then split it, you would see certain marked differences in its different parts which are represented in Figure 1.

It can be seen that a large part of the corn is relatively pure starch, another part is rich in proteid matter, and yet another part contains much oil. The following table shows whereabouts in this corn kernel the finished products of the farmer's machine are contained.

TABLE A.

Parts.	Per cent. of total Protein.	Per cent. of total Oil.	Per cent. of total Ash.	Per cent. of total Carbohydrates.
In tip caps...............	1.14	.69	1.06	1.56
In hull............	2.07	1.08	3.06	6.80
In horny parts.........	59.03	14.53	16.94	58.27
In white starchy part.	17.62	1.27	4.39	28.40
In germs........	20.14	82.43	74.55	4.97
In total corn.. ..	100.00	100.00	100.00	100.00

This table tells of the total proteid matter; a very little is in the tip caps, little in the hull, about six-tenths in the horney part, about one-sixth in the white starchy part and about one-fifth in the germs. Of the total oil, the horny part, contains less than one-seventh and most of the rest is in the germ. The germ likewise contains about three-fourths of all the mineral matter which forms part of the compounds contained in the seed. The last column shows that the white part shown in the drawing, while called the starchy part, in reality contains less than one-half the amount of starch and starch-like compounds which are in the kernel. The horny part, which is richest in proteid, is also richest in starchy matter.

To cause nature to increase the amount of proteid matter is one of the most important of the modern problems for the expert corn grower; for if he can so change the conditions of feeding and growth that the proteid matter will be increased and the starchy matter decreased, his grain of corn will more quickly approach the balance ration and will contain more of that substance for which the farmer pays most when he buys concentrated food stuffs, for concentrated food stuffs are food stuffs rich in proteid matter principally.

Dr. Hopkins of the Illinois Agricultural Experiment Station has had wonderful success in coaxing Dame Nature to make more concentrated food stuffs in the laboratories which are situated in the corn. He has been able to increase the proteid by more than one-third and this is accompanied by a large increase in oil and the consequent decrease in starch.

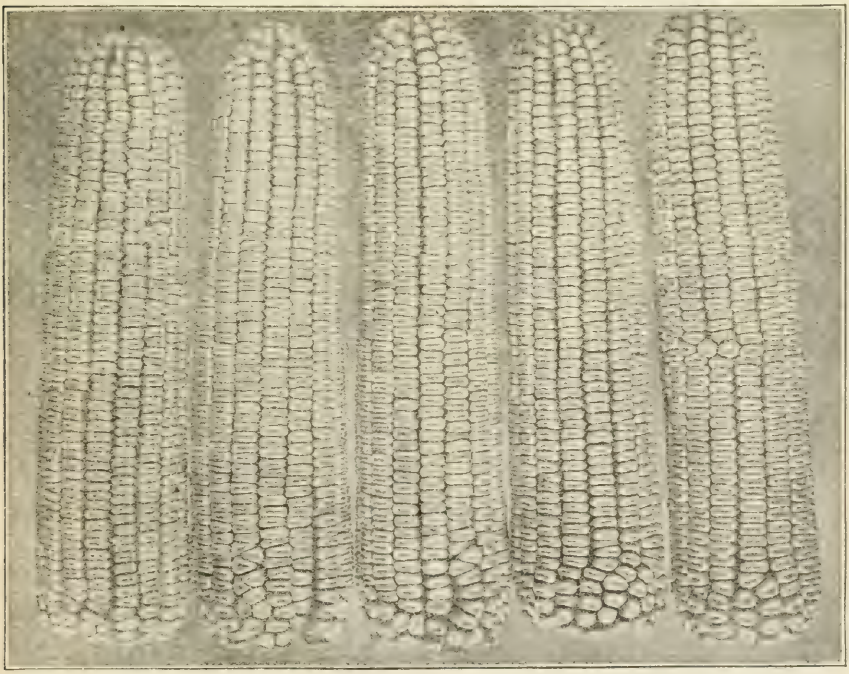
Even if one should want to raise corn for the starch factory, it would probably be best to increase the horny part, because although you thereby decrease the starch, the valuable by-products (oil and concentrated cattle food) would be increased at a much greater ratio than the starch would be decreased, and the total value of all the mill products would be greater than with the corn poor in proteid.

We may sum up roughly the changes that are spoken of in which carbon plays the most important part as follows:

Carbonic acid, gas and water.. — Carbohydrates................ and Nitrogen, Potassium, Phosphorus, Sulphur, etc. — Starch and oil, Proteid matter (as end products).

Nitrates—Relatives of ammonia Carbohydrates. — Nitrogenous-Organic-Compounds; with Phosphorus and Sulphur. — Proteid matter

During the few minutes that remain I shall speak very briefly of those for us more important chemical elements which the plant obtains from the soil, namely the nitrogen, the phosphorus and the potash. As you know, the nitrogen is taken up by the roots in the form of a nitrate. It is changed probably in the stem to a near relation of ammonia and goes in that form to the leaf cells where it is combined with carbon, oxygen and hydrogen to form protoplasmic materials, these in turn yielding the proteid which builds muscle and tissue in the animal. The phosphorus enters the plant root in the form of a phosphate, the potash probably as a salt of an organic acid. These also probably go first to



ST. CHARLES YELLOW.—Grown by C. S. Greisnauer, O'Fallon, Mo. Ears deep golden yellow, smooth, 9½ to 10 inches long and 7 to 7½ inches in circumference. Cob red. Rows of kernels rather open, making it somewhat loose on the cob. Kernels of fair depth. This is a good foundation for a promising variety. Exhibited at State Corn Show. Crop 1904.

the leaf cells in order that they may aid in the production of starch and proteid.

The cell must have phosphorus or it cannot digest its nitrogen. If it does not get a sufficient quantity of phosphorus, it cannot digest enough nitrogen to satisfy its needs. It must have nitrogen or it cannot assimilate the carbonic acid gas which the leaf breathes in as we breathe in the air. It must have potash in order to accomplish the changes whereby the carbon of the atmosphere becomes starch, sugar and oil. In brief, phosphoric acid governs the quantity of nitrogen the plant can take up; and the nitrogen the quantity of carbon it can breathe in; and potash the formation of organic substances.

Such is about what goes on under your eyes every day in every plant, and while we have applied it to this particular plant that is under discussion, the same is true of all plants because the compounds that I have mentioned occur in all, and the machines which Nature provides only manufacture more of one and less of another.

*MISSOURI CORN SCORE CARD.

Uniformity of Exhibit	10
Maturity and Market Condition	15
Shape of Ears	10
Color	
(*a*) Kernels	5
(*b*) Cob	5
Butts	10
Tips	5
Shape of Kernel	10
Proportion of Length to Circumference	10
Space between Kernels	5
Proportion of Corn to Ear	15
Total	100

DIRECTIONS FOR JUDGING.

Uniformity of Exhibit.—The ears of the exhibit should be similar in size, shape, color and indentation. For each ear defective in this respect cut the exhibit not more than one point.

Maturity and Market Condition.—Ears should be firm and kernels sound and free from mould and injury. Kernels should be tight on the cob. Determine this by twisting in the hand or moving kernels with the thumb. Cut not more than one point for each ear defective in these respects.

Shape of Ear.—The ears should be cylindrical or nearly so. Cut not over one point for each tapering ear.

Color.—

(*a*) Kernels—Kernels should be uniform in color. Cut 1-10 point for each kernel that is off color. If 5 or more the ear will of course be cut the full limit—1-2 point.

(*b*) Cob—The cobs should be all of one color. Cut one point for each cob off color up to three which will disqualify the exhibit.

Butts.—Butts should be well rounded out with deep, regular kernels, solidly compacted together. Attachment to the stalk for medium varieties should be 3-4 inch. Cut not more than one point for each cob showing marked defects.

Tips.—There should be deep kernels well out to the end of the ear in as regular rows as possible. The ideal tip is completely covered. Cut 1-2 point for tips seriously defective.

Shape of Kernels.—The kernels should be uniform in size and shape. They should be uniformly wedge-shape but not too pointed. The length should be a little over once and a half as long as the width. Remove three kernels from near the middle of each ear for comparison. Cut one point for each ear with poorly shaped kernels.

Proportion of Circumference to Length.—The proportion of circumference to length should be as 3 to 4, or the circumference divided by the length should give .75. An ear 10 inches long should be 7½ inches around at one-third the distance from butt to tip. Cut one point for each ear markedly defective in this proportion.

Space Between Kernels.—Furrows between rows should be narrow and kernels should fit tightly together in the row. Cut not over ½ point for each defective ear.

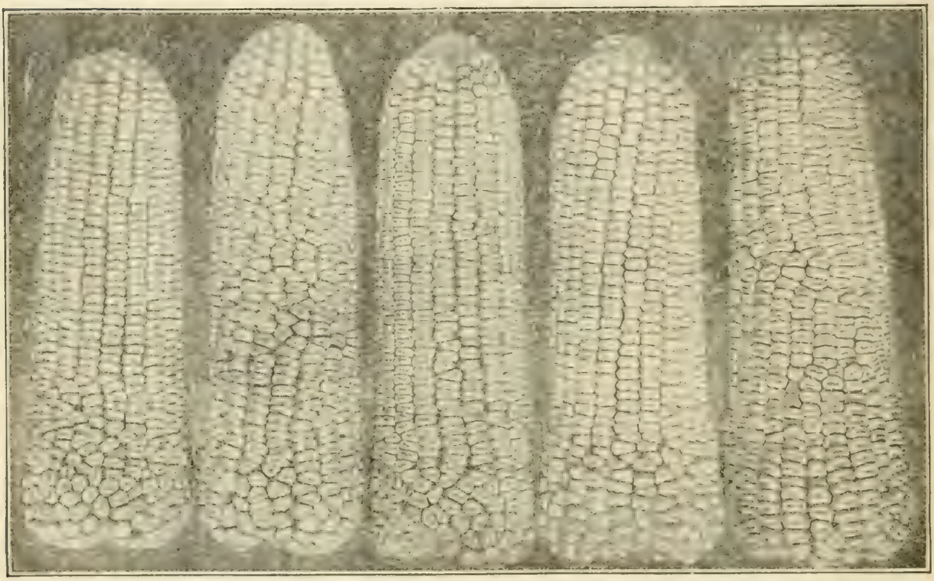
Proportion of Corn to Ear.—The proportion of corn to ear should not be under 85 per cent. Cut 1½ point for each per cent below this limit. The per cent is best determined by shelling every other ear of the exhibit and weighing. It may be done with a fair degree of accuracy by shelling but two representative ears.

*OFFICIAL SCORE CARD.

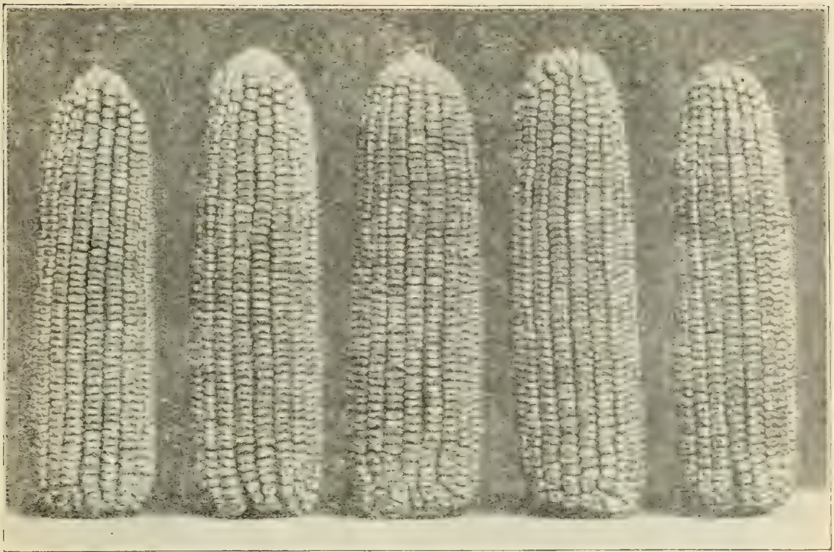
Although the Missouri Corn Growers' Association has been organized for about two years, this is the first announcement of an official score card to be used in judging corn in this State. It was deemed better to make haste slowly than to make a mistake in the adoption of a score card that could not be used in judging some of our best corn. At the Annual Meeting of the Corn Growers' Association held in the

Agricultural College January 12, 1905, a committee was appointed to prepare and publish a score card which is to be the official standard for judging corn for the present year or until it shall be changed by the association. No standard of varieties of corn has been adopted; therefore, it is necessary to adopt a score card that may be used with some modification in judging all varieties exhibited. As soon as a standard has been fixed and different varieties recognized as standard by the association, it will then be necessary to adopt a score card for each standard variety.

SAMPLE EARS EXHIBITED AT STATE CORN SHOW—CROP 1904.

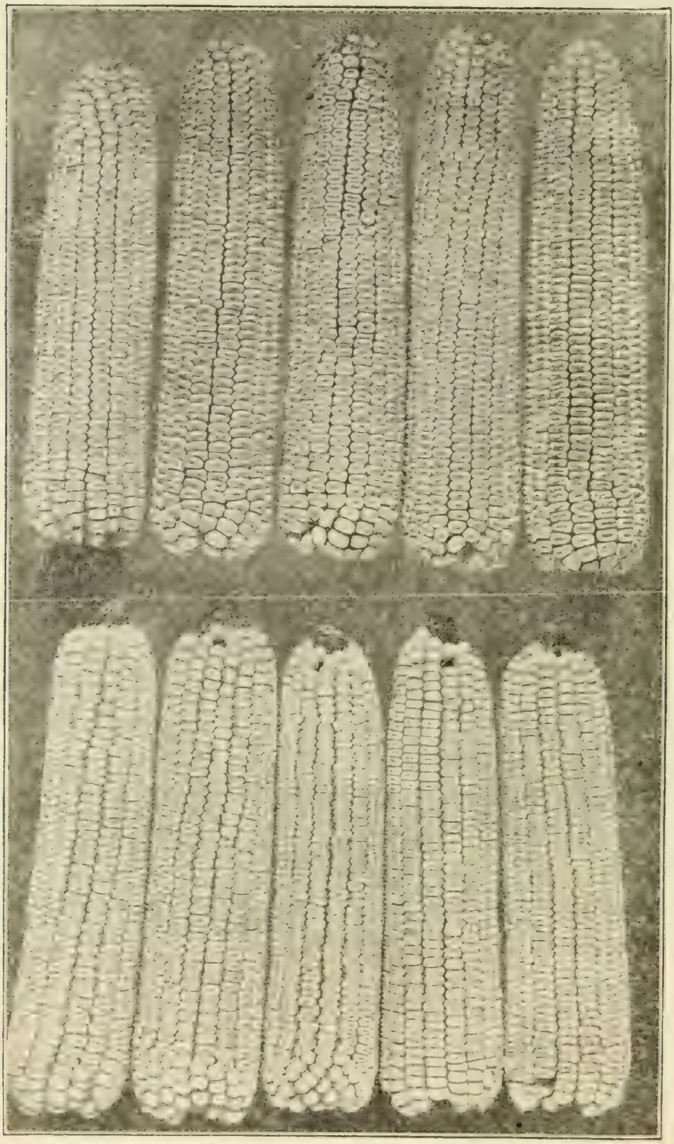


COB PIPE CORN, grown in Franklin Co., Mo. Ears 8½ to 9 in circumference near butts, smooth, cobs very large especially near butts, white in color, kernels shallow and rather wide. This corn is raised especially for the cobs which are used in the manufacture of pipes.



CARTNER CORN. Grown by T. W. McFarland, Cooper Co., Mo. Ears a rich golden yellow, 7½ to 7¾ inches long, 7¼to 7¾ inches in circumference. Inclined to be rough. Cobs small, deep red color. Kernels very deep. Rather inclined to spread at top, and to be loose on the cob. This corn was originated in Cooper county by John Cartner about forty years ago. This corn won a gold medal at the World's Fair, St. Louis. At the State Corn Show in 1904, it made a higher per cent of shelled corn than any other variety exhibited, testing 90.3 per cent shelled corn. Mr. R. B. Johnston of Cooper county reports a yield in 1904 on one acre of 80 bushels and 25 pounds, which is an excellent yield for so unfavorable a season. This corn is increased somewhat in size will no doubt make an excellent variety for medium uplands soils.

SAMPLE EARS EXHIBITED AT STATE CORN SHOW—CROP 1904.



TOP ROW: St. Charles White, grown by Geo. H. Sly, Rockport, Mo. Ears 9 to 9½ inches long, 7 to 7½ in circumference, inclined to be rough, cobs deep red, medium size, kernels fair depth.

BOTTOM ROW: St. Charles White, grown by J. H. Plackemeier, St. Charles, Mo. Ears 8½ to 9 inches long, 6½ to 7 inches in circumference, inclined to be smooth, cobs deep red, medium size, kernels fair depth.

DISCUSSION OF SCORE CARD.

Dr. G. M. Tucker—The proportion of corn to cob is something that has very little relation, it has been found, to the actual production, so far as yield per acre is concerned, that is, we can have a small cob with a large amount of grain relatively on it, and that kind of a cob may produce very small ears, or its other characteristics be such that it does not produce a big yield per acre. Some of the new score cards, in place of the proportion of corn to cob, call for the actual weight of the grain, the actual weight of the grain being much better indication of the productivity of the corn than the length or circumference of the ear. It is the weight of the grain that we take in computing the yield per acre, and the weight of the grain on the ear multiplied by the number of ears in the field will give that yield. The amount of grain on the ear is the thing that we are after and counts more than anything else in profit.

The score card, while it does not in any of its points actually bear upon the productivity of the corn, yet it does have an important bearing upon bringing before the producer little points found in the corn which go to make up corn and which have a special bearing in producing a high bred corn and corn which has character, so that before big yields can be intelligently produced the score card must be studied closely and these points brought out by studying the ear.

The points which are actually useful to the producer—the grower of corn—are character. By character I mean just the general appearance, the conformation, I may say, of the ear which shows breeding; then weight of the grain; the commercial grade—which, of course is important; and the yield per acre. These four points are the ones which have a direct bearing upon the interests of the corn grower.

In selecting my seed corn last spring I judged it by the score card. I had no other means. That was the teaching that I had had, that the score card was something by which I could judge my corn, and in computing the value of each ear as a breeding ear I based my judgment by comparing each ear with the score card and in planting my breeding plats I put my best ear—or the one I thought ought to produce the largest yield, judging from the appearance of the ear—in the center of the plat and graded on either side toward the edges, so I had the best ear in the middle and the poorest ears on either side.

Mr. Ellis—What were the results?

Dr. Tucker—The results were quite peculiar. My best ear which was numbered 34, was right in the middle of the plat; it gave a yield

of 105 bushels per acre which was very good. It was a fairly good sized ear—9.8 inches long and had a weight of 14½ ounces of grain. The per cent of grain to cob was 91, which was very high for Boone County White. That was exceptionally high, and I had an idea that I had a very fine ear of corn, and it produced 105 bushels per acre. But let me show you where my best ear was: it was the second one from the outside edge. That was my most productive ear, the one that gave the largest yield per acre, and it was one that I had considered to be about the poorest ear in the lot. It gave a yield of 156.3 bushels per acre. It was a large ear, having rather small per cent of grains on it, but it had a power of reproduction which cannot be found out by the score card. The weight of the grain on that ear was one pound.

Mr. King.—Was there any difference in the care given it?

Dr. Tucker.—None. We planted one row after the other, taking the same care.

Mr. King.—You said this was next to the last row. What of the last row?

Dr. Tucker.—The ear on the last row on that side made 144 bushels per acre. That was more than my best ear.,

Mr. Ellis.—Was there any difference in the soil?

Dr. Tucker.—There was no difference that I could discover. It was in the midst of a one hundred acre field.

Mr. Boles.—How do you account for the fact that your good ear did not make any more?

Dr. Tucker.—It was only good looking. It did not have good blood in it.

Dr. Huston.—What kind of corn was it?

Dr. Tucker.—Boone County White.

Dr. Huston.—Was there any relation between the position of your tiles from drains to this plat that could influence it?

Dr. Tucker.—I think not as the large yielding ears were scattered throughout the plat, not all being on one side.

Dr. Huston.—It was symmetrical so far as the plat was concerned?

Dr. Tucker.—Yes, and the yields varied the other way as well.

Mr. Boles.—Then you never know the best ear until you try it?

Dr. Tucker.—I did not then know because I bought the seed. In the future I will select the seed from the actual performance and not from the score card. It is all right on the show table to compare exhibits. I do not see that it has value anywhere else except as an aid in studying corn.

Mr. King.—Of two equal scoring exhibits the one with the best pedigree is the one to plant?

Dr. Tucker.—Yes, a pedigree based on performance and not on the score card—a pedigree based on the actual yield in the field.

I had a photograph of some of the ears that I bred from last year. I photographed all of them so as to get an idea of how they would reproduce themselves in shape and appearance.

Mr. ———.—What was the lowest yield per acre?

Dr. Tucker.—40 bushels. They ranged from 40 to 156 bushels per acre.

Mr. ———.—Did you plant by tier or by row?

Dr. Tucker.—By row. I did not plant all of the corn on the ear, but from the same place on the ear. Whatever I used I planted from the whole length of the row on the ear.

Mr. ———.—Was the ear that produced 40 bushels apparently as good as the others?

Dr. Tucker.—No, not quite so good. It was a smaller ear than some of the others. I had placed it next to the last. The second best ear produced 144½ bushels to the acre. That ear weighed 18 ounces, its per cent of grain was only 81 and we are taught that is very low. The per cent of grain for Boone County White should be 86. This one was way below the standard, and yet the actual amount of grain on that ear was 14½ ounces. It lacked only an ounce and a half of putting a pound of grain on that ear. The ear that produced only 40 bushels to the acre had on it only 11½ ounces to the ear. So there seems to be in general some relation between the actual amount of grain in weight on an ear and the total yield per acre of grain. The ear that gave the smallest yield was a pretty good ear according to the score card. I placed it as No. 17 in my plat, and the one which gave the largest yield I placed as No. 24. These yields were apparent even in the gathering—in the size of ears themselves.

Mr. Reed.—Where was the seed raised that you planted?

Dr. Tucker.—In Illinois.

Mr. Reed.—Was the seed corn pollinated by corn in the same patch or by corn in that neighborhood?

Dr. Tucker.—It was all the same kind of seed, the Boone County White, and this breeding plat was entirely surrounded by the same variety.

Mr. ———.—On what kind of soil?

Dr. Tucker.—Drained, re-claimed swamp lands near Blodgett, Scott county.

Dr. Huston.—Not peat lands are they?

Dr. Tucker.—Yes, rather peaty.

Dr. Huston.—Enough to burn?

Dr. Tucker.—I do not know. I should think not. There is quite a little sand mixed in with it.

Mr. ———.—Do you ever investigate whether the quantity of yield per acre had anything to do with the percent of starch or protein in the corn?

Dr. Tucker.—No. There is a question that I would like very much to have discussed and on which I would like to have the opinions of those who have formed any, and that is the advisability of breeding corn for a high per cent of protein, to be placed on the market or used by the feeders. Is it profitable for a man who has the ground to grow corn which requires a large amount of nitrogen to augment the natural tendency of corn to grow protein or is it better to grow a kind of corn that will produce oil and grow alfalfa, cow peas, clovers or some of the leguminous plants and get his nitrogen from the air rather than from the soil?

Mr. ———.—Does not the protein in the corn weigh heavier than the starch? Does not the flinty corn outweigh the other?

Dr. Tucker.—Yes, the flinty corn outweighs the other. There are two kinds of starch, horny and flaky. Weighed per grain or ear, the flinty corn would produce a little heavier weight, that is the struck half bushel of the flinty corn would weigh heavier than a struck half bushel of the rough corn, but where weighed per acre, we get the greater yield from the rough corn, we are finding down in Scott county.

There was some complaint about the Boone County White corn because it was sort of chaffy or light weight, a struck half bushel weighing only 27 pounds, while the more flinty corn would weigh 29 pounds, but they did not take into account how much area they had to go over in their land to get that half bushel. One ear of the chaffy corn would produce more than one ear of the flinty corn because the kernel was so much deeper.

Mr. Gabbert.—I prefer the dent corn always to feed to cattle compared with the flinty corn, unless you grind the latter.

Col. Waters.—In my judgment it would be unwise for the farmer to breed for a high per cent of protein because he will have enough to do to increase the actual yield, disregarding the protein and to raise this protein in other crops. I totally disregard the idea in farm practice of endeavoring to develop especially high protein corn. Put all your emphasis on increase in yield, because we can go forward in the develop-

ment of a single particular much better than we can carry forward two or more particulars.

Dr. Huston.—So far as you know does the market distinguish between high protein corn and high starch corn?

Dr. Tucker.—I have not found one that does in those terms. Of course there is the hominy market.

Dr. Huston.—The corn for the hominy market is a white, flinty corn, and has as a basis the Johnson County White. Outside of the hominy district, so far as I know, there is no great market for this special kind of corn, but outside of that district there ought to be a market for the high-starch corn, and hominy mill people and the starch people ought to want a corn with a relatively high oil because it is a very important factor, particularly in the starch factories. But whether they are willing to pay for it is another matter.

There is another kind of corn that from the farmer's standpoint seems to be very profitable and easy on the land, and that is a corn with cob that will carry five pounds or more of water to the bushel. This is the type of corn they like to sell to the elevator man, and have been very successful in doing so. Five pounds of water to seventy pounds of corn is a pretty fair margin, and I know farmers who esteem this type of corn very highly, combined, however, with a very high yield.

Mr. Gabbert.—I prefer that kind both for yield and feeding value.

Mr. ———.—Why does Mr. Gabbert prefer a soft ear for feeding?

Mr. Gabbert.—It will grind smoother. In feeding whole ears to beef cattle they will thrive faster on softer than on flinty corn.

Dr. Huston.—As far as the hominy corn goes, the feeding tests on hogs have shown no difference, practically, between white hominy corn and the ordinary yellow corn of the corresponding neighborhoods.

Dr. Tucker.—It seems to me, without the data to go by, that a man is treating his farm better and liable to get better results from feeding the kind of corn which does not have a tendency to high protein power than one that does. I want to know whether that is right or not.

Mr. Gabbert.—Protein is pretty high when you buy it, but it does not cost much in legumes.

Dr. Huston.—Don't you think it possible to develop a less flinty corn with a high protein?

Dr. Tucker.—The point I had in mind was in producing a high protein you are using a large quantity of nitrogen which is difficult to get in the corn. Putting the protein there is an expensive operation, as it impoverishes the soil of that expensive element.

Dr. Huston.—If you feed it you can get it 80 per cent easier.

Dr. Tucker.—If you grow it in a legume, so much the better.

Mr. ———.—The tendency of the protein corn is to become starchy all the time.

Dr. Tucker.—Yes, it has to be bred close to keep up the protein content all the time. It has to be selected for that purpose or it will run back again to the usual kind.

Mr. ———.—Is it profitable to grind corn and cob together?

Mr. Gabbert.—Yes.

Mr. ———.—It is said both cattle and hogs feed better on yellow corn than white.

Dr. Tucker.—You cannot pin any quality to color. The value of the corn depends on where and how it is grown.

Mr. ———.—Do you select a small or large cob?

Dr. Tucker.—Very little depends upon the size of the cob. A great many have complained about the Boone County White corn because of the large cob, but a large cob has more grain. The larger the cob, within certain limits, the larger the amount of grain.

Mr. Boles.—The large cob matures slower.

Dr. Tucker.—Yes, and takes a later growing season.

Col. Waters.—It exhausts the land more.

Dr. Tucker.—Only because it grows a bigger yield.

Mr. Erwin.—Did you ever notice which will raise more bushels, on poor land, the large or the small variety?

Dr. Tucker.—A comparatively small-ear variety will do better on thin land than the large ear.

Mr. Erwin.—That is my experience.

Dr. Tucker.—About the capping over: Whether the corn growing over the tip of the cob has anything to do with the breeding quality or not, is another question. I would just as soon plant an ear that is not as one that is fully capped over. I would just as soon breed from it. I do not think data enough has been taken to know which does the best. Actual performance is better than such a minor point as that.

Another point in the score card is the length of the ear. The standards adopted by the Illinois association called for a definite length of ear. The Boone County White ears that we planted ranged from 8 to 9½ inches, but in the crop I gathered from that there were many ears which were 10 inches in length and over. I have some of them here.

Mr. ———.—Where did the score card fellows get their standard?

Dr. Tucker.—From the standard in that community. When you grow a corn on different soil, you must have a different standard. You

must take into consideration the climatic and soil conditions under which that corn was grown.

Dr. Huston—What do you think of the 14-inch ears shown in the Missouri exhibit? Is there any object in producing that particular type of corn?

Dr. Tucker—I do not know. They are usually so slender, the cob and the ears equally small. A cylinder like that has less corn on it than a thick one. I go by weight of grain, as we judge the race horse by the speed and the dairy cow by her butter performance, we measure the corn by its productiveness.

Mr. Mumford.—How important is it that an ear should be cylindrical? What facts have we to prove that a cylindrical ear is better than a deeper ear?

Dr. Tucker—The greatest point is the uniformity of the kernel. As an ear tapers, the kernels will grow smaller or be irregular.

Mr. ————Unless the cob tapers relatively.

Dr. Tucker—Even then there will be irregularity if the rows drop out and that means a possibility of not getting a uniform stand in dropping with the planter. So far as actual yield is concerned, I do not know that there is much difference. I do not know why there is not the same chance of the cob tapering as the ear does.

Mr. Gabbert—They are getting graders to grade the seed, it would be better if a man buy seed corn that has been run through the grader.

Dr. Huston—Don't you think it advisable to always buy seed corn on the ear?

Dr. Tucker—Yes.

Mr. Boles—Why?

Dr. Tucker—Because one can see the size of the ear he is getting. The shape does not make so much difference. You can get just as good looking grains from any of the low grade ears where the ear is too short or not big enough. But if the farmer buys his seed corn in the ear he sees what he is getting and the probabilities are that he will get better ears. If he buys the shelled corn he would not know the difference, the kernels of the small ear look as well as the kernels of the big one.

Mr. Carroll—When will Missouri be able to get over that sneer about the score card?

Dr. Tucker—When all our farmers breed ears that will produce 156 bushels to the acre. Of course the score card will have to be used or at least those points which the score card brings out will have to be studied in improving corn because there is, of course, undoubtedly some relation.

Mr. ————Don't you think that farmers should study to know their type of soil in studying the type of corn to plant?

Dr. Tucker—Within certain limits. Of course there are different types of soil and corn becomes adapted to a certain type, and should not be changed abruptly to a different type of soil. The Boone County White is adapted to a fertile soil and when put on a clay hill, it probably would not produce as well as some other variety.

THE QUERY BOX.

(Conducted by Prof. F. B. Mumford.)

Q. Will it do to cultivate corn after it gets too large for the two-horse cultivator?

Mr. Laughlin—Yes sir, for the reason that the corn does not really begin to make its growth until brace-roots are formed. The object of cultivation largely is to get rid of the weeds and other grasses that grow around them and which would take up the nutrition that the corn plants should have.

Prof. Mumford—What kind of cultivation ought we to give?

Mr. Erwin—Just as shallow as it is possible and disturb as few of the roots as possible.

Prof. Mumford—What is shallow cultivation and what is deep cultivation?

Prof. Miller—Usually shallow cultivation runs about 2 1-2 inches on upland. On some soils, it might be considered that 3 or 3 1-2 inches would be shallow. It depends upon the soil largely, but 2 to 2 1-2 inches would be pretty shallow cultivation. With very wide shoveled cultivators that would be out of the question, but with fine toothed instruments, it should be about 2 1-2 inches.

Q. Will white corn yield more per acre than yellow corn?

Prof. Mumford—The yield of corn does not depend upon color.

Q. Is there any virtue in the cob? If not, what is gained by grinding it?

Prof. Forbes—Grinding the cob with the meal is of benefit only in feeding steers. It is of no benefit in the feeding of hogs. We grind the cob with the meal, not because of any very great amount of nutriment that it contains, but in order to lighten up the meal. If fed to a hog, it is a detriment to the animal. For steer feeding, if corn is worth 30 cents per bushel, we are adding 7 1-2 cents worth to it by grinding and if we can grind for 7 1-2 cents a bushel, it is worth it, but if not, it is not.

Prof. Mumford—There is very little nutriment in the cob. It is sometimes an advantage to lessen the ration, it promotes digestion, averages real nutrition in the corn meal better. It would probably be just as efficient, if not more, to mix the corn meal with chaff.

My experience in grinding corn and cob meal is if you grind the cob fine enough so that it is finished as a feed, it will cost more than it is worth. It is of no advantage to feed cob the way it is ordinarily ground in large pieces. However, where the experiment stations have carefully investigated this matter and have ground the cob fine enough, it is true that a pound of corn and cob meal has been as valuable as a pound of pure corn meal and we might assume that it is, when mixed in that proportion, of the same value as a pound of corn meal, but you must always carry with that the idea that it must be ground fine, and there's the rub.

Q. Is the corn worm or its fungus injurious to live stock that is fed on such corn?

Prof. Mumford—That is a question that has agitated a good many men in the last few years.

Mr. Gabbert—It is not the worm, it is the dust that injures the horses more than cattle.

Prof. Mumford—It seems to be the general impression that there is some injury following the feeding of such corn to animals. Whether from insects or dust, it is not as good corn as corn not worm-eaten.

Q. Is it better to feed cotton seed meal to beef cattle in connection with corn?

Prof. Mumford—We have fed cotton seed meal a little to beef cattle at the Experiment Station for seven years, and it has been our experience in almost all of these experiments that when corn is worth 50 cents a bushel and cotton seed meal is worth $22 to $24 a ton that it does pay to feed cotton seed meal.

There are two things that we aim at in feeding cattle, we aim to finish them to a point where they will satisfy the demands of the market and to make the gain necessary to produce that finish at the smallest possible cost. If you consider only the increased gain from a given amount of grain, it does not always pay to feed the cotton seed meal. A hundred pounds of corn fed on blue grass pastures will produce the gain more cheaply than the corn and cotton seed meal can but the cotton seed meal will fit them for sale very quickly.

It sometimes pays to feed a small amount of corn and cotton seed meal when it would not pay to feed a large amount.

Q. Should each farmer have a corn breeding plat next year?

Prof. Mumford—That was threshed out pretty well today and some decided that he should while others decided that he should not, and my opinion is that it will not help matters for us to continue the discussion on that subject here. It is a question in my mind. Every man should not be a breeder of purebred cattle or horses and it is a question in my mind if every farmer should try to breed pedigreed corn. It is a nice theory and it is a nice business, so far as that is concerned, but the average farmer is concerned with making money and if every farmer was a breeder of corn, I am afraid they would be like Kilkenny cats. But it is safe to say this, that it might be profitable for every farmer here to go home and have a breeding plat next year. This question lies with the farmer.

Q. Will a general planting of the Hallet wheat reduce it to the original?

Prof. Mumford—I expect that is aimed at me because I had something to say about Hallet wheat here today. It is a principle which applies to the breeding of plants and animals that in order to maintain them to the state of development to which they have been brought under certain conditions, those same conditons must apply. The Shorthorn and Hereford breeds of cattle have been developed under high conditions of feeding, care and shelter. These cattle will not maintain their high excellence and quality under poor conditions of feed and shelter, and no improved variety of wheat or corn, under careless handling will maintain the good qualities which have been brought by good conditons.

Q. Which would be the most profitable, to plant corn checked or drilled?

Prof. Mumford—Is it more profitable to grow corn in hills three or four feet each way or in rows or drills as we say? I will call on Mr. Laughlin to answer that question.

Mr. Laughlin—It is better on my farm to grow in hills because the cultivation can be carried on both ways, and if we have a wet season we can get the weeds.

Q. What constitutes the best seed corn for the Missouri River bottom land?

Prof. Mumford—There are two questions here by different persons on the same subject, "What is the best variety of corn for river bottom land in the State of Missouri?" Who has some varieties of corn growing on river bottom lands? I suppose nearly everyone who has had experience in growing corn on river bottom land would recommend two varieties for Missouri—they may not be the only ones but there are two varieties that have given uniformly high yields on

bottom lands, the St. Charles White and the Boone County White. Is there any other that is better than either of these?

Dr. Huston—I am not quite sure about Missouri River bottom, but the Wabash River bottom lands yield the best with the McKinley, which is a yellow corn. While I do not know that it has ever been compared with your St. Charles White corn, it has had to compete with Johnson County White corn and other corns of that class like Riley's Favorite and Boone County White and the McKinley corn has exceeded the other varieties on the Wabash River bottom.

Q. Has anyone tried early corn in a river bottom planted early by the side of large corn? How did it do?

Mr. Erwin—I have never planted it, but I have known of its being planted a number of times. It will yield 5 or 6 barrels where the large corn will yield 10 or 12.

Q. What is the best method of using corn fodder?

Prof. Mumford—I presume that this question refers to corn stover. Corn fodder is common in Missouri after the ears have been removed and this is a practical question—it is a *live* question. We hear a good deal at the present time about silos and shredded fodder and stalk fields and other methods of utilizing the fodder or stover. This is a question upon which we could spend the entire evening in trying to answer it and we mght not come to any better agreement at the end of the discussion than before, but will Mr. Harned please tell us about the best method of utilizing the corn fodder?

Mr. Harned—I suppose you mean the fodder after it has been shocked?

Prof. Mumford—Yes.

Mr. Harned—Well I think there is a great difference of opinion about that. I am afraid I will be very much by myself, but I have been convinced that I would not have my fodder shredded if I could have it done free. I believe that it would be worth more taken out of the shocks and scattered on the grass just as it is, the simple and old plan, and I never have been convinced so far that there is anything better.

Mr. Erwin—I have handled shredded fodder a good deal and I shred it and then bale it. I often take the shredder into the field and set the baler behind the shredder and use a slat elevator instead of a blower to feed the baler and it is the most economical way. If Mr. Harned had to go out a day like this and get the fodder in out of the snow, I am sure he would prefer to have it in the barn.

Prof. Mumford—How many in the audience have shredded fodder

and prefer that method of handling it? Three. How many have shredded it and do not like that method of handling it? Five.

There are some facts in regard to the utilization of corn fodder in Missouri that it will be well for us to consider. There are thousands of tons of fodder going to waste in the State of Missouri every year. The men who own this corn fodder in the stalk fields get a return of 25 cents an acre for it, or 25 cents a ton as it is now handled.

It is a principle which is always correct that you cannot afford to put too much work on a cheap product and as long as we waste so much fodder, we will not spend much money in preparing it in any way, in the silo, or shredding it or any other way.

We have performed one experiment in trying to feed shredded fodder as against that not shredded. It seemed to indicate that the animals would eat more fodder not shredded, but it required less fodder when it was shredded. They had to eat more of the faulty part when it was shredded because we could manage to fool them and work off on them some of the pith, but when it was not shredded they were able to take out the good part and discard the remainder.

Mr. Shephard—I have had quite a little experience in feeding fodder to milk cows and there the effect is very easily detected, beacuse it is an effect that shows in a very few days' time and I agree with Mr. Harned exactly that the best way to feed fodder is directly from the shock and scattered over the pastures. Often it is greater economy from the fact that it takes less labor that way and the stock can select the best part of it and reject the faulty part, and there is always faulty fodder. The trouble with the shredded fodder is that the faulty part is mixed with the good and the cows are either compelled to eat what is not good or reject the whole, and after quite a little experience I agree exactly with Mr. Harned.

Mr. Erwin—I have been feeding shredded fodder since 1900. My cows were disposed to sort the fodder and take out the good and reject the bad, and I have fed corn fodder not shredded to my cows for more than 30 years. I find from much experience in handling a large quantity of corn fodder and getting it from the field during the winter that it is cheaper to handle it shredded than from the field direct and I find no difficulty so far as the yield of milk is concerned or so far as the growth of the animals is concerned; and I find that the corn fodder is far better than timothy hay, especially for horses that may be affected with heaves.

Mr. Harned—How can Mr. Erwin find it cheaper to shred the fodder than to use it whole, it costs $1.50 a ton to shred it?

Mr. Erwin—It costs in our section of the country 15 cents a shock

to get the fodder husked out in the field by hand. We can get the machine and an engineer and feeder to run the shredder for 12½ cents a shock. The same team that it takes to move the fodder out of the field will move it to the shredder and you balance the one with the other and then the work is done and the fodder is stored so that it is ready to handle and can be taken out whenever you want to feed it.

Q. At what age can high grade cattle be made to weigh 1200 to 1400 pounds, given the ordinary farm treatment and feeding the general farm methods.

Mr. Gabbert—I do not know what the ordinary conditions are. I do not know what ordinary farm treatment is. It would take him all his life, the way cattle are treated on some farms. I have fed a good many Hereford steers and I can make them weigh that at 22 months old and I generally sell about that time. But I do not have ordinary farm conditions—I have the best I know how.

Q. In the selection of the premium corn, was there any thought given to the value of the fodder?

Prof. Miller—The value of the fodder is always considered in making field selections, but on the judging table we can know nothing about that at all.

Q. Which is the most nutritious as a feed for horses, hogs and cattle, white or yellow corn?

Prof. Mumford—Well it depends on the corn. It happens that one of the varieties of corn which has been improved in the direction of high protein content is the white corn, but there is no essential difference in the yield or quality of corn, dependent upon color. Color is not related to the valuable characteristics of corn in any very close way. There are some varieties of yellow corn better for hogs and horses, and vice versa.

METHODS OF CORN BREEDING.

(Cyril George Hopkins, Ph. D., Professor of Agronomy in the Agricultural College and Chief in Agronomy and Chemistry in the Agricultural Experiment Station.)

From Bulletin No. 82, Ill. Ex. Sta.

It is a well established fact that there now exists markets and demands for different kinds of corn.

The price of corn varies, say from one-half cent to one cent per pound.

The cost of protein in the principal stock feeding states varies from three to five cents per pound. In other words, the protein is several

times more valuable per pound than corn itself. Consequently, stock feeders want more protein in corn. (Very possibly the feeders in the southern states want more carbohydrates to supplement their present more abundant supplies of nitrogenous food stuffs.)

The price of corn starch varies from two or three cents to five or even 10 cents per pound, depending upon the wholesale or retail nature of the sale. The manufacturers of starch and of glucose sugar, glucose syrup, and other products made from starch want more starch in corn. In its own publication a large commercial concern, which uses enormous quantities of corn, makes the following statements:

"A bushel of ordinary corn, weighing 56 pounds, contains about 4½ pounds of germ, 36 pounds of dry starch, 7 pounds of gluten, and five pounds of bran or hull, the balance in weight being made up of water, soluble matter, etc. The value of the germ lies in the fact that it contains over 40 per cent of corn oil, worth, say 5 cents per pound, while the starch is worth 1½ cents, the gluten 1 cent, and the hull about ½ cent per pound.

"It can readily be seen that a variety of corn containing, say one pound more oil per bushel would be in large demand.

"Farmers throughout the country do well to communicate with their respective agricultural experiment stations and secure their co-operation along these lines."

These are statements and suggestions which should, and do, attract the attention of experiment station men. They are made by the Glucose Sugar Refining Company of Chicago, a company which purchases and uses, in its six factories, about fifty million bushels of corn annually. According to these statements, if the oil of corn could be increased one pound per bushel, the actual value of the corn for glucose factories would be increased 5 cents per bushel; and the president of the Glucose Sugar Refining Company has personally assured the writer that his company would be glad to pay a higher price for high oil corn whenever it can be furnished in large quantities. The increase of five cents per bushel on fifty million bushels would add $2,500,000 to the value of the corn purchased by this one company each year. The glucose factories are now extracting the oil from all the corn they use and are unable to supply the market demand for corn oil. On the other hand, to these manufacturers, protein is a cheap by-product and consequently they want less protein in corn.

Corn with a lower oil content is desired as a feed for bacon hogs, especially for our export trade, very extensive and thorough investigations conducted in Germany and Canada having proved conclusively that ordinary corn contains too much oil for the production of the hard,

firm bacon which is demanded in the markets of Great Britain and Continental Europe.

The methods of corn breeding devised by the Illinois Experiment Station and now used not only by us, but also by the Illinois Seed Corn Breeders' Association, and, to some extent, by other Experiment Stations and other corn breeders, have for their object the improvement of corn—in yield and in quality. In the main the methods are now the same as we have employed for the past six years and they have given results which enable us to assert with confidence that by these methods corn can be improved in a very marked degree and for many different purposes. The yield of corn can be increased, and the chemical composition of the kernel can be changed as may be desired, either to increase or to decrease the protein, the oil, or the starch.

Following is a brief description of the methods of corn breeding which we practice and which we have recommended to others:

PHYSICAL SELECTION OF SEED CORN.

The most perfect ears obtainable of the variety of corn which it is desired to breed should be selected. These ears should conform to the desirable standards of this variety and should possess the principal properties which belong to perfect ears of corn, so far as they are known and as completely as it is possible to secure them. These physical characteristics and properties include the length, circumference, and shape of the ear and of the cob; the number of rows of kernels and the number of kernels in the row; the weight and color of the grain and of the cob; and the size and shape of the kernels. In making this selection the breeder may have in his mind a perfect ear of corn and make the physical selection of seed ears by simple inspection, or he may make absolute counts and measurements and reduce the physical selection almost to an exact or mathematical basis.

In this connection let me suggest that there is some danger of corn breeders making too much of what might be called fancy points in selecting seed ears. We should learn the facts which are facts and not base our selections too much upon mere ideas and opinions. For example, it is not known that ears whose tips are well filled and capped with kernels are the best seed ears. Indeed it is not improbable that the selection of such seed ears will cause the production of shorter ears and a reduced yield per acre. It is true that the percentage of shelled corn from a given ear is the greater, the greater the proportion of corn to the cob, but our interest in that percentage is very slight compared to that of yield per acre, and perhaps for the greatest possible yield of

shelled corn per acre it requires that the ears shall have good sized cobs. Possibly the corn which shall ultimately surpass all others for yield per acre will have tapering and not cylindrical ears. These are some of the points regarding which men have some ideas and opinions, but as yet we have no definite facts, and we shall need several years more to obtain absolute knowledge regarding some of these points. Let us base our selections of seed corn first upon known facts and performance records, and secondly upon what one may call his "type" of corn.

CHEMICAL SELECTION BY MECHANICAL EXAMINATION.

The selection of seed ears for improved chemical composition by mechanical examination of the kernels is not only of much assistance to the chemist in enabling him to reduce greatly the chemical work involved in seed corn selection, but it is of the greatest practical value to the ordinary seed corn grower who is trying to improve his seed corn with very limited service, if any, from the analytical chemist. This chemical selection of seed ears by mechanical examination, as well as by chemical analysis (which is described below), is based upon two facts:

1. That the ear of corn is approximately uniform throughout in the chemical composition of its kernels.

2. That there is a wide variation in the chemical composition of different ears, even of the same variety of corn. These two facts are well illustrated in Table 1.

TABLE 1—PROTEIN IN SINGLE KERNELS.

	Ear A, protein, per cent.	Ear B, protein, per cent.	Ear C, protein, per cent.	Ear D, protein, per cent.
Kernel No. 1	12.46	11.53	7.45	8.72
Kernel No. 2	12.54	12.32	7.54	8.41
Kernel No. 3	12.44	12.19	7.69	8.73
Kernel No. 4	12.50	12.54	7.47	8.31
Kernel No. 5	12.30	12.14	7.74	8.02
Kernel No. 6	12.49	12.95	8.70	8.76
Kernel No. 7	12.50	12.84	8.46	8.89
Kernel No. 8	12.14	*	8.69	9.02
Kernel No. 9	12.14	12.04	8.86	8.96
Kernel No. 10	12.71	12.75	8.10	8.89

*Determination lost by accident.

It will be observed that, while there are, of course, small differences among the different kernels of the same ear, yet each ear has an individuality as a whole, the difference in composition between different ears being much more marked than between different kernels of the same ear.

The uniformity of the individual ear makes it possible to estimate or to determine the composition of the corn by the examination or analysis of a few kernels. The remainder of the kernels on the ear may

then be planted if desired. The wide variation in the composition between different ears furnishes a starting point for the selection of seed in any of the several different lines of desired improvement.

The methods of making a chemical selection of ears of seed corn by a simple mechanical examination of the kernels is based upon the fact that the kernel of corn is not homogeneous in structure, but consists of several distinct and readily observable parts of markedly different chemical composition. (See illustrations.) Aside from the hull which surrounds the kernel, there are three principal parts in a grain of corn:

1. The darker colored and rather hard and horny layer lying next to the hull, principally in the edges and toward the tip end of the kernel, where it is about 3 millimeters, or ⅛ of an inch, in thickness.

2. The white, starchy-appearing part occupying the crown end of the kernel and usually also immediately surrounding, or partially surrounding, the germ.

3. The germ itself which occupies the central part of the kernel toward the tip end.

These different parts of the corn kernel can be readily recognized by merely dissecting a single kernel with a pocket knife, and it may be added that this is the only instrument needed by anybody in making a chemical selection of seed corn by mechanical examination.

The horny layer which usually constitutes about 65 per cent of the corn kernel contains a large proportion of the total protein in the kernel.

The white, starchy part constitutes about 20 per cent of the whole kernel, and contains a small proportion of the total protein. The germ constitutes only about 10 per cent of the corn kernel, but, while it is rich in protein, it also contains more than 85 per cent of the total oil content of the whole kernel, the remainder of the oil being distributed in all of the other parts.

By keeping in mind that the horny layer is large in proportion and also quite rich in protein, and that the germ, although rather small in proportion, is very rich in protein, so that these two parts contain a very large proportion of the total protein in the corn kernel, it will be readily seen that by selecting ears whose kernels contain more than the average proportion of germ and horny layer we are really selecting ears which are above the average in their protein content. As a matter of fact, the method is even more simple than this, because the white starchy part is approximately the complement of, and varies inversely as the sum of the other constituents; and to pick out seed corn of high protein content it is only necessary to select those ears whose kernels show a relatively small proportion of the white, starchy part surrounding the germ.

As more than 85 per cent of the oil in the kernel is contained in the germ, it follows that ears of corn are relatively high or low in their oil content, according as their kernels have a larger or smaller proportion of germ.

In selecting seed corn by mechanical examination for improvement in composition we remove from the ear a few average kernels; cut two or three of these kernels into cross sections and two or three other kernels into longitudinal sections and examine these sections as they are cut, usually simply with the naked eye.

If we are selecting seed ears for high protein content we save those ears whose kernels show a small proportion of the white starch immediately adjoining or surrounding the germ. If selecting corn for low protein content we look for a larger proportion of white starch surrounding the germ. Our results have shown that the white starch in this position, that is, surrounding the germ toward the tip end of the kernel, is a better index of the protein content than the starch in the crown end.

If we are selecting seed ears for high oil content we save those ears whose kernels show a large proportion of firm and solid germ; while if seed of low oil content is desired, we look for a small proportion of germ in the kernel.

It should be emphasized that it is not the absolute, but proportionate, size or quantity of germ or of white starch which serves as a guide in making these selections.

CHEMICAL SELECTION BY CHEMICAL ANALYSIS.

In selecting seed corn by chemical analysis we remove from the individual ear two adjacent rows of kernels as a representative sample. This sample is ground and analyzed as completely as may be necessary to enable us to decide whether the ear is suitable for seed for the particular kind of corn which it is desired to breed. Dry matter is always determined in order to reduce all other determinations to the strictly uniform and comparable water-free basis. If, for example, we desire to change only the protein content, then protein is determined. If we are breeding to change both the protein and the oil, then determinations of both of these constituents must be made.

For a satisfactory breeding plot, about 20 to 40 selected seed ears are required. If the breeder desires to make only physical improvement then he should select, say, 40 of the most nearly perfect ears which it is possible to pick out by inspection or by exact physical measurements. If it is desired to improve the composition or quality of the corn as well as the physical properties, then at least 200 physically perfect ears should

be selected, and, from these 200 ears, the 40 ears which are most suitable as seed for the particular kind of corn which it is desired to breed should be selected, either by mechanical examination of sections of kernels, which anybody can make, or by chemical analysis, or by a combination of these two methods. In our own work we now commonly select by physical inspection or measurement the 200 ears; then, from these 200 ears, we select by mechanical examination of sections of kernels the best 50 or 100 ears, and from this lot we finally select by chemical analysis the best 20 to 40 seed ears for planting. This combination of methods effects a very satisfactory seed selection and requires only one-half as much chemical work as would be required if the method of chemical analysis alone were employed.

Table 2 shows very fairly the degree of seed improvement which may be accomplished by these different methods of selection, when breeding to change only the protein content of corn.

It may be stated that equally satisfactory results may be obtained in chemical selection by mechanical examination for securing seed ears of high or low oil content. For example, the writer has selected by mechanical examination, from a lot of 272 ears of corn, 18 ears for high oil content which averaged 5.24 per cent of oil; and, from the same lot of corn, 30 ears were selected for low oil content which averaged 4.13 per cent oil, making an average difference of 1.11 per cent of oil.

TABLE 2—SOME FAIR ILLUSTRATIONS OF ACTUAL RESULTS OBTAINED IN SELECTION OF SEED CORN.

(Protein, average per cent.)

Variety.	200 average seed ears.........	50 ears selected by mechanical examination...	28 ears selected by chemical analysis......	10 best seed ears.	Best single seed ear.... ......
Silver Mine........	10.00	9.47	8.77	7.97	7.00
Boone County White...	10.57	9.72	9.36	8.84	8.69
Leaming	11.96	11.36	10.79	10.08	8.82
Leaming..........	11.96	12.44	13.33	14.03	14.63
Leaming.......	11.27	11.84	12.43	13.12	14.71
Yellow Dent...	11.14	11.64	12.11	12.55	13.24
Riley's Favorite...	11.02	11.38	12.41	12.99	15.78
Burr's White...	12.48*	12.88	14.36	14.87	15.71
Burr's White....	9.20†	9.10	7.77	7.56	7.08
Leaming..	11.26	12.14‡	....	....	... .
Leaming..............................	11.26	10.67‡	....	....	....

* Average protein content of ten field rows of Burr's White after four years' breeding for high protein.

† Originally from same stock of Burr's White as preceding, but bred four years for low protein.

‡ Two lots of 42 ears each selected from the same lot of 200 ears for two breeding plots, high protein and low protein, the seed for which is selected by physical inspection and mechanical examination but without chemical analysis of individual ears.

If the method of mechanical examination alone is employed in making the chemical selection, then, if possible, there should be some chemical control of the work, at least until the breeder has become sufficiently skilled, or has had sufficient experience, to feel that he knows how to make a chemical selection of seed ears by mechanical examination of kernels. Such a chemical control does not involve a large amount of chemical work. In Illinois the Experiment Station offers such a chemical control to farmers who will agree to make the selection of the best possible seed, both by physical inspection of ears and mechanical examination of kernels and who will further agree to secure data and breed the corn in accordance with our directions.

This control is affected by analyzing only two samples of corn each year; one composite sample of the rejected ears, five average kernels being taken from each ear, and one composite sample of the 20 to 40 selected seed ears, twenty average kernels being taken from each of these ears, and each of these two composite samples being properly labeled and analyzed.

One of the best selections which has yet been made by mechanical examination was accomplished last spring by a farmer who is breeding corn for higher protein content. Out of a lot of 165 ears of corn he selected 15 ears whose protein content averaged 1.48 per cent higher than that of the 150 rejected ears, as was determined by the chemical analysis of a composite sample from each of the two lots. Because of the chemical control which the station affords him, he knows each year just how much he has accomplished.

If the purpose of breeding a kind of corn is principally to change its content of a single constituent, as to increase protein, then the selection of the best 40 ears is simple and regular by either method; but if it is desired to effect changes in the content of two constituents, as to increase the protein and to increase the oil in the same corn, then one could hardly expect to make much progress in both directions, if he relied solely upon mechanical examination of kernels for chemical selection of seed ears. Even after the chemical analyses of 100 ears have been made it requires some computation to determine which are really the best 40 ears. For example, an ear may be desirable for seed because of its high protein content, but it may not be sufficiently high in oil. In order to reduce the selection to an exact basis, we have adopted simple mathematical computations for all such cases.

For high protein and high oil in the same corn, we multiply the percentage of protein by the percentage of oil and use the product as the selection coefficient, the forty highest products designating the forty best ears.

For low protein and low oil we multiply the percentages together and use the lowest product as the selection coefficient.

For high protein and low oil in the same corn, we divide the percentage of protein by the percentage of oil and use the highest quotients as our selection coefficients.

TABLE 3—SELECTION OF SEED CORN FOR HIGH PROTEIN AND HIGH OIL.

No. Ear.	Protein in corn.	Oil in corn.	Selection coefficient
1	11.17	6.03	67.30
2	12.66	4.90	62.00
3	13.60	4.92	66.89
4	10.85	4.55	49.89
5	11.01	5.72	62.97
6	11.50	4.77	54.81
7	14.71	5.56	81.75
8	10.07	4.73	47.62
9	13.14	5.44	71.53
10	10.19	5.80	59.10
11	11.01	5.97	65.78
12	10.39	4.73	49.13
13	13.96	5.28	73.72
Average	11.87	5.26	62.50

For low protein and high oil we divide in the same manner, but use the lowest quotients for selecting the best ears.

Table 3 illustrates the value of this method as applied to the selection of the best seed ears for both high protein and high oil.

It will be observed that some ears which are high in only one desirable constituent (see No. 2 and No. 10) must be discarded because the selection coefficients which they give are even below the average; while other ears which may be quite low in one constituent (see No. 1 and No. 3) still furnish acceptable selection coefficients.

THE BREEDING PLOT.

The 40 selected seed ears are planted in 40 separate parallel rows, one ear to a row, consequently the breeding plot should be at least 40 corn rows wide and long enough to require about three-fourths of an ear to plant a row. It is well to shell the remainder of the corn from all of the 40 ears, mix it together, and use it to plant a border several rows wide entirely around the breeding plot, to protect it, especially from foreign pollen.

In my judgment one of the most practical and satisfactory locations for the breeding plot is in a larger field of corn planted with seed which is as nearly as possible of the same breeding as that planted in the breeding plot itself. The stock seed for this field should always be selected from the previous year's breeding plot and it may well include as many of the 160 rejected ears as are known to be above the average of the 200.

Or, if the breeding plot can be well isolated from all other corn fields and still occupy good soil, this also makes a very suitable location for it.

The very best ears of seed corn are planted in the center rows of the breeding plot, the remainder of the ears being planted in approximately uniform gradation to either side, so that the least desirable ears among the 40 are planted in the outside rows; and in the final selection of the best field rows from which the next year's seed ears are to be taken, some preference is given to the rows near the center of the plot.

While we are not yet ready to make absolute statements regarding the matter, nevertheless, from the data which we have secured, and are securing upon the subject, we now recommend that every alternate row of corn in the breeding plot be completely detasseled before the pollen matures, and that all of the seed corn to be taken from the plot be selected from these 20 detasseled rows. This method absolutely prohibits self-pollination or close-pollination of the future seed. By self-pollination is meant the transfer of pollen from the male flower of a given plant to the female flower of the same plant; and by close-pollination is meant the transfer of pollen from the male flower of one plant to the female flower of another plant in the same row, both of which grew from kernels from the same seed ear.

The transfer of pollen from one plant to another plant which grew from kernels from a different seed ear, we term cross-pollination. We have been for several years accumulating data which show that artificial self-pollination is very injurious to the vitality and vigor of the seed produced, and we have also secured data pointing toward an injurious effect of close-pollination even by natural methods, so that we feel justified in recommending, at least tentatively, the use of cross-pollination in seed corn breeding.

It is also recommended that in the 20 rows of corn which are not detasseled no plants which appear imperfect, dwarfed, immature, barren, or otherwise undesirable, should be allowed to mature pollen. Detasseling is accomplished by going over the rows two or three times and carefully pulling out the tassels as they appear.

Occasionally an entire row is detasseled because of the general inferiority of the row as a whole.

FIELD SELECTIONS BASED ON PERFORMANCE RECORDS.

As the corn crop approaches maturity we are then ready for the first time to begin at the real beginning in the selection of seed corn; that is, with the whole corn crop and the whole corn plant, as it stands in the field.

THE FIRST CHAMPIONSHIP ROADSTER TEAM.

The above cut was made from a photograph of the first prize championship roadster team at the St. Louis World's Fair. "Sometimes" and "Always," a beautiful pair of chestnuts, full brothers, four and five years old. They have been shown in double harness through two seasons, making sixteen shows and winning sixteen first premiums. "Always" has made twenty-three shows in single harness, winning eighteen first premiums, four second and one third, being beaten in three of the above rings by his mate "Sometimes." "Sometimes" won at the World's Fair in single harness two first, four second, and was fourth in the world's championship for roadsters. Missouri's claim to being the first State in the Union for first class road horses has been fully sustained by this great team.

The above team owned and exhibited by Alex. Bradford, Jr., Columbia, Boone county, Missouri.

We then make our first selection of seed corn from the field rows (each of which is the progeny of a separate single ear) on the basis of performance record. Each of the twenty detasseled rows is carefully examined. Some of them are discarded for seed purposes by simple inspection, and with some rows this decision may be made early in the growing season; because, when each field row is planted from a separate individual ear, that row has an individuality which in many cases is very marked. It may show very imperfect germination (in the most careful work the germinating power of each ear is ascertained before planting), it may be of slow growth, produce small weak plants, or numerous barren stalks. The plants may be tall and slender or very thick and short. In one row the ears may be borne high on the stalks, while in the adjoining row they may average one or two feet nearer the ground. One row may yield more than twice as much corn as an adjoining row on the same kind of soil. As a matter of fact, when one begins to breed corn by the row system (one seed ear to each row), he is usually surprised to find that the plants in some rows are so very different from those in others, as will be seen from data from one of our 1901 breeding plot, which are given in Table 4.

TABLE 4—PERFORMANCE RECORD OF BREEDING PLOT, 1901.

(Breeding for high protein.)

Field Row Number.	Protein in seed ear.	Weight of ear corn in crop.
1	12.06	91.0
2	12.17	86.0
3	12.19	98.5
4	12.26	99.5
5	12 31	77.0
6	12.40	118.0
7	12.66	116.0
8	12.83	54.5
9	12.90	107.0
10	15.78	103.0
11	12.93	87.0
12	12.90	127.5
13	12.72	113.0
14	12.45	123.5
15	12.32	103.5
16	12.31	92.0
17	12.23	85.5
18	12.18	117.0
19	12.07	140.5
20	12.06	97.0
Average	12.59	101.9

We take no seed corn from a row which produces a large proportion of imperfect plants, barren stalks, small ears or a low yield, even though a few apparently good seed ears might be found in the crop which that row yields.

The points to be considered in the selection of the field rows, and finally in the individual plants from which seed ears may be taken should

include the per cent of "stand" of plants, the height and physical proportions of the plant, the character and amount of foliage, the position of the ear on the stalk, the length and size of the ear shank, the per cent of ear-bearing plants, the time of maturity, the total yield of the row, the average weight of the ears, and the number of good seed ears which the row produces.

Some of these points can be determined by inspection; some require actual counts and measurements or weights.

The corn from each of the detasseled rows which have not been rejected by inspection is now harvested. First, all of the ears on a row which appear to be good ears and which are borne on good plants in a good position and with good ear shanks and husks are harvested, placed in a bag with the number of the row, and finally weighed together with the remainder of the crop from one ear to a row; then select your seed for the next year, on the basis of performance record, from about 10 rows which produce the highest yield and the best ears.

Second: Breed corn for a purpose. If you wish to feed corn, breed and grow high protein corn. If you wish to grow corn for the starch and glucose factories, breed and grow corn the factory wants.

Third: Until we have facts, don't devote too much time to "fancy points," such as trying to produce kernels on the tip end of the cob, or trying to reduce the size of the cob, or trying to make the tip end of the ear as large as the butt, or pulling out suckers, or doing other things the ultimate effect of which is unknown. It is not yet known with any degree of certainty whether such things are beneficial, injurious, or without effect, on the production of the crop.

And don't feel that you can't breed corn even if you are unable to detassel barren stalks. Last year we had fields with 50 per cent of barren stalks, this year in some fields from that seed we have about five-tenths of one per cent of barren stalks, and these examples fairly illustrate the tremendous effect of soil and season and condition of growth, as compared with breeding, upon the production of barren stalks. Barren stalks bear no ears, and the whole tendency of Nature's Law is to breed them out, and even without the intervention of man. As a matter of fact, in order to give to barren stalks an equal chance with ear-bearing plants to propagate themselves, we should be obliged to detassel every ear-bearing plant in the field. In studying this problem it should be borne in mind that the female parent of the barren stalk was not barren.

It is probably much more important that we absolutely prevent self-pollination and close-pollination by detasseling alternate rows, but ever this practice is still an experiment. It is very true that exceedingly poor

corn has been produced by artificial or hand self-pollination, but recent experiments have also shown that corn may be degenerated by artificial cross-pollination; and it should be understood that our recommendation to detassel alternate rows in the breeding plot is tentative, and I certainly would not urge this practice. Probably such detasseling will prove somewhat helpful to the corn breeder, but we know that very great improvement can be made without detasseling at all, simply by selecting seed on the basis of performance record and for desirable quality or composition.

THE TESTING OF CORN FOR SEED.

(Albert H. Hume, First Assistant in Crop Production. From Bulletin No. 96, Illinois Experiment Station.)

In suggesting the plan of testing each ear of seed corn, we do not mean to insist that every ear must be tested every season and in every place. We do insist, however, that this would be within easy range of possibility, as the following pages will show. Before time for planting, corn growers should test a sufficient amount of their stock of seed, ear by ear, so that they will know what they have on hand. It may or may not be necessary thus to test the entire stock, but that it would have been an extremely profitable procedure the past season for most farmers, can scarcely be doubted.

It is not sufficient to accept the warrant of the dealer from whom the seed is purchased, however trustworthy he may be. It is not possible for those who handle seed on the largest scale to give the closest attention to its quality. The following devices for testing are suggested as being obtainable for the general farmer.

Methods of Testing.—There are several methods of testing corn, all of which depend upon the same principle, namely, that of supplying sufficient moisture and warmth to the kernels to cause them to sprout. The traditional ways of determining the quality of seeds, such as floating them in water, or heating them until they pop, or breaking them and noting the fracture, or cutting them and noting the appearance of the inside, cannot be called tests, although it must be granted that by practice some corn growers have become fairly expert in telling whether or not a given sample of corn will grow. Such methods are not only less accurate, but if carefully performed require as much or more time than need be taken to make a germination test.

One of the best and simplest ways of sprouting seed is to take a common dinner plate and fill it nearly full of sand. The sand should be

as clean and white as possible. Such sand will be less likely to mould than that which has much organic matter in it. This makes it much more desirable for use in testing, for moulds interfere with the germination of the corn. After the sand is placed on the plate, it should be moistened. This can best be done with a small sprinkler, but if one is not at hand, the water may be poured carefully out of any small vessel or sprinkled with the hand. After sprinkling the water on the sand, it is well to mix the sand with the fingers until it is all equally moist. Do not saturate the sand with water. Special caution is necessary in this respect, for if the sand is too wet, the corn will fail to germinate for lack of air. Numerous failures have been reported in testing corn on plates of sand, the most of which probably resulted from having the sand too wet.

Having the sand properly placed and moistened, the kernels to be tested should be pressed into the sand, small end down, in order as they are taken from the ear. While taking the kernels from the ear, hold it in the left hand and remove with a pocket-knife or a pair of small, strong tweezers, a kernel two inches from the butt of the ear. A little practice will make it easy to remove a kernel with the knife and hold it between the thumb and the knife blade until it is put in place in the sand. Then turn the ear one-fourth around and take another kernel in the same manner, say two inches nearer the tip; then turn the ear the same distance again and take another kernel two inches nearer the tip. For the fourth kernel, turn the ear again one-fourth around and take the kernel about two inches from the tip. Four kernels is a large enough number to take from one ear for practical work. If they are properly taken, they represent both ends and all sides of the ear, so far as vitality is concerned. The four kernels from each ear must be placed in a separate group, and it is best that the group be marked or numbered to correspond.

The Germinating Room.—After the kernels of corn are all placed as described above, they should be covered by turning a second plate over them to prevent too rapid evaporation of the moisture from the sand. They may then be left in a warm temperature to sprout. As fast as the kernels are well germinated, they should be removed from the sand, and a careful record taken of the number which have sprouted. It has been proved by experiment that the best temperature for germinating corn is 77 degrees F. This is only a little higher than the temperature of an ordinary living-room. More harm will result from a considerable decrease of temperature than from a slight increase.

On the average farm it is not necessary to construct a special room

for germinating. Usually the plates of corn will germinate well if put beside a stove, taking care that they do not get too hot. The plates must be inspected each day after they are put into the germinating room, and if the sand is becoming dry, add a little water. The amount to be put on must be determined by practice, for it will vary with the kind of sand used and with the humidity of the room. If one is fortunate enough to have furnace heat in the cellar, he will probably have a place near the furnace where the heat will be about right for germinating corn. Such heat was utilized by Dr. C. G. Hopkins, of the University of Illinois, in testing the corn for his own farm in southern Illinois, with entirely satisfactory results.

Testing with Plates and Sand.—The method of using the plates of sand for germinating corn is very practicable in that any one can use it without purchasing any new material. Dinner plates are at hand on any farm, and sand may usually be had from the roadway or river bottom. But where there is much testing to do the method is inconvenient, and in some cases unprofitable, from the fact that it takes too much time. Time is lost in filling the plates with sand and in gauging the proper amount of moisture, when it must be renewed from time to time.

Testing with Box and Cloth.—One of the quickest and most convenient devices for making germination tests is that commonly known as the Geneva Tester, so called because it was first used by Professor Goff at the Geneva Station in New York. This apparatus consists of a water-tight box across which are extended folds of canton flannel. These folds are suspended from wires, and can be removed to dry when not in use. The box must be filled to the depth of about an inch with water, so that the folds of canton flannel will hang down enough to touch the water, and thus be moistened by capillarity. The box should be about 12 by 24 inches and 4 or 5 inches deep. It may be made of wood, galvanized iron, tin, or copper, and the wires can be cut from ordinary smooth galvanized fence wire. When kernels of corn are to be tested in this germinating apparatus, they are removed from the ears as described above, placed between the folds, in regular order and the folds closed together. If it is thought best, the groups of kernels from the separate ears may be numbered with slips of paper. This numbering will not be absolutely necessary if proper care is used to have the groups of kernels correspond to the ears of corn from whence they came. After the kernels are put in place, the folds are drawn together at the top, the lid closed upon the box, and the apparatus left until the kernels germinate. When put into this box, the kernels will not usually suffer for moisture during the length of time of one test. This is one of the ad-

vantages of the Geneva Tester over the plate of sand where the moisture may need renewing each day, or even oftener. The folds are easily opened when it is necessary to inspect the kernels to count the number which have germinated. Some care is necessary in lifting the tester, that the groups of kernels be not jarred from their places.

Testing with Box and Blotters.—Another plan is to use a small box, with layers of moistened blotting paper inside. This device consists first of a small box, say a foot long, six inches wide, and five inches deep. The bottom of the box should be made water-tight; if necessary, the cracks may be stopped with white lead or strips of cloth or asbestos. The kernels of corn are kept moist by putting water into the box to a depth of one-half inch more or less. Something must be laid in the box to hold the first blotter up out of the water. Small sticks laid crosswise of the box will answer this purpose.

The blotting papers should be moistened as they are placed in the box. When the first blotter is laid in, either small sticks or wire cloth are put down on top of it to mark the spaces for the separate groups of kernels. These spaces must correspond to the spaces in the frame where the ears of corn are placed. After one layer of blotting paper is covered with the kernels, another similar layer may be put down on top of the first, and so on until the box is filled, or until the desired amount of corn has been put in.

Like the plate and sand method and the wooden box Geneva Tester, this device is easy to use on the ordinary farm because it does not necessitate the buying of any expensive apparatus or material. If small sticks are substituted for the wire gauze, it will only be necessary to purchase the pieces of blotting paper, which can be secured at a merely nominal cost of almost any printer or stationer. Of course the wooden box will sometimes warp and begin to leak, making it somewhat difficult to keep the blotters from becoming too dry. Where it is desired to use a tester for any large amount of work, it is usually best to have the box made of copper.

We have gone into the matter of explaining the devices for testing seed corn at some length from the practical standpoint, in the hope that the greatest number of corn growers will arrange to test seed by one of the methods. The method of doing the work is not of such paramount importance as that it be done, and done thoroughly.

In advocating the testing, when necessary, of every ear of corn intended for seed, we have been met with the objection that "it takes too much time." We have therefore made some careful computations along this line. In Table I we have recorded the time in minutes used in

testing each of nine one-bushel lots of corn. Column one gives the number of the lot, column two, the number of the ears in the measured bushel, and column three, the total time used in testing four kernels from each ear, in the Geneva Tester, with which we have been able so far to do our quickest work in testing.

TABLE 1.

Number of lot.	Number of ears in bushel tested.	Total time used in testing.
1	100	45 minutes.
2	98	44 minutes.
3	75	34 minutes.
4	116	56 minutes.
5	80	48 minutes.
6	77	38 minutes.
7	95	42 minutes.
8	96	46 minutes.
9	126	48 minutes.

Total time for 9 bushels, 401 minutes.
Average time for 1 bushel, 45 minutes.

From the above table, it will be seen that the total time used in testing 9 bushels of corn of various sized ears was 401 minutes. It takes longer to test a bushel of small ears than a bushel of large ones, but the average time per bushel is 45 minutes. At this rate, counting only 5 acres to one bushel of seed, one man, in 10 hours' total time, can test every ear of seed corn required to plant 67 acres. Of course the work must be done before planting time. It is suggested that winter evenings might profitably be employed in this way, but if the work is not done in the evenings, let it be done by daylight as part of the regular work. At all events, do not permit it to be overlooked, especially when we have such seed corn as much of that planted in 1904.

TABLE 2.

Number of lot.	Number of ears tested in measured bushel.	Time required for testing in sand.
29	100	80 minutes.
30	98	85 minutes.
31	75	63 minutes.
32	88	75 minutes.
33	92	72 minutes.

Total time required to test 5 bushels, 375 minutes.
Average time required to test 1 bushel, 75 minutes.

As seen by the above, the average time for testing in sand is 75 minutes per bushel as against 45 minutes per bushel with the Geneva

Tester. It is apparent that any one who has any amount of testing to do, can well afford to make a Geneva Tester or have one made, rather than use sand.

It is sometimes urged that one who has had sufficient practice can select seed corn which will grow, simply by inspecting it, and that testing is unnecessary.

There are many persons who can tell, with some accuracy, by simple examination, whether or not corn will grow, but we do not believe that inspection can be so accurate as testing. Moreover, the time used in carefully inspecting each ear in a given lot of corn is usually as great or greater than the time used in testing the same ears. The time required depends much upon the care with which the work is done. If four kernels are taken from each ear of corn and each kernel examined carefully and the germ inspected, it will require more time than it will to test the kernels in the Geneva apparatus. The average time used at the station for inspecting thirteen bushels of seed corn with reasonable care, was 31 minutes per bushel. With two lots, when four kernels were removed from each ear and carefully examined, the average time required was 44 minutes per bushel. The average time for testing these same two lots in the Geneva Tester was 32 minutes per bushel. Even when the time element is taken into consideration, the evidence is all in favor of carefully tested seed for the corn grower, as opposed to that selected mechanically.

The following table shows the results which were actually attained with 37 different lots of seed corn:

Eighteen of these lots of corn came to the Experiment Station from progressive farmers, and nineteen came from the most trustworthy corn specialists to be found. In the table given, column 1 indicates simply the number of the lot of corn tested. Column 2 gives the number of ears in that particular lot, and column 3 indicates the per cent of the corn, taken just as it came to the station, which germinated. This test was simply a composite one. Three kernels were taken from each ear, one from the butt, one from the middle, and one from the tip. After three kernels were thus taken from every ear in the entire lot, they were mixed together, and 100 of them were selected at random. These 100 kernels were germinated and the resulting per cent was put into column 3. After this composite test was made, every ear in each lot was tested, by taking four kernels from an ear and germinating them in sand. In case any one of the four kernels did not grow, the ear from which it came was discarded as unfit for seed. The number of ears thus discarded is recorded in column 4. The remainder were reserved as being good

for seed. Then, in order to determine whether such testing really accomplishes the desired object, composite tests were made of the "good corn," which was reserved for seed, and of the "poor corn," which was discarded. The per cents for the various lots, as derived from these tests, are recorded in columns 5 and 6.

TABLE 3.

No. of test.	Number of ears tested.	Composite test of all ears.	Number of ears discarded	Percent of germination after testing.	
				Good corn.	Poor corn.
1	41	91.0	11	98.9	82.0
2	439	82.5	144	97.0	68.0
3	81	87.0	12	99.0	72.2
4	371	84.0	95	95.0	55.0
5	34	78.0	18	97.9	72.2
6	330	95.0	51	98.0	80.0
7	433	94.0	38	100.0	72.0
8	414	83.0	124	95.0	63.0
9	552	77.0	299	86.0	67.0
10	389	97.0	31	100.0	85.5
11	88	96.0	14	97.0	80.9
12	80	82.0	18	94.0	70.8
13	298	93.0	44	98.0	71.0
14	89	93.0	10	97.0	66.6
15	60	84.0	22	96.0	77.0
16	18	88.8	5	89.7	66.6
17	43	83.0	20	90.0	40.0
18	451	96.0	33	99.0	68.0
19	332	93.0	88	98.0	81.0
20	456	62.0	295	93.0	30.0
21	278	74.0	164	86.0	36.0
22	109	87.0	21	97.0	71.4
23	45	83.0	17	97.6	75.0
24	40	51.0	28	97.2	52.3
25	73	89.0	20	95.0	48.0
26	144	92.0	36	95.0	81.0
27	100	93.0	25	97.0	69.8
28	98	91.0	18	95.0	68.9
29	75	94.0	17	95.0	76.0
30	88	87.0	26	96.0	66.6
31	92	93.0	13	93.0	77.0
32	116	90.0	39	93.0	70.0
33	80	86.0	34	83.0	75.0
34	77	68.0	41	74.0	42.0
35	95	74.0	54	90.0	57.0
36	96	64.0	63	80.0	51.0
37	126	97.0	20	96.0	60.3
Averages.		85.19		94.00	66.11

It will be observed that the per cent of germination of the "good corn" in column 5, is higher in every instance than the per cent of germination of the "poor corn," in column 6; also that there are only two instances—that of test number 33, composed of 80 ears, and that of test number 37, composed of 126 ears—in which the per cent of germination for the good corn is not as high or higher than that of the composite sample from which it came. This evidence therefore practically all goes to indicate that the plan is effective. In other words, having given a number of ears of seed corn, it is possible to determine with accuracy which of those ears have the highest average per cent of germinable kernels.

The average of all the tests of "good corn" in column 5 is 94.00 per cent. The average of the composite tests of the lots of corn from whence those good ears were taken, is 85.19 per cent. The original lots were made up of seed corn, which was carefully selected by ordinary methods before it came to the Agricultural Experiment Station. The difference between 94.00 and 85.19 is 8.81 per cent, in favor of the "good corn," which is clearly attributable to the fact that every ear was tested and only the "good ones" reserved. That this difference is correct is further attested by noticing the average per cent of the "poor" lots of corn in column 6, which is 66.11. Evidently from this, no mistake was made in the kind of ears discarded.

It is fair to assume, according to the above figures, that the seed corn planted in Illinois during the spring of 1904, might have been at least 8.81 per cent better than it was. Although it does not follow absolutely, it is not far from correct to reason that the crop is 8.81 per cent lighter than it might have been, had the best seed attainable been used. This is a conservative estimate considering that the original lots of corn above were probably better than the average seed corn planted in Illinois in 1904.

Granting, then, that 8.81 per cent of the seed planted failed to grow and that there were 1,000,000 bushels of corn used for seed in Illinois, the amount of corn planted which did not grow was 88,100 bushels. Valuing it at $2.00 per bushel, it represented a dead loss of $176,200. This amount alone would pay for testing practically every ear of corn planted in Illinois, counting labor at $1.50 a day. The great loss, however, consists in the shortage of the crop due to this poor seed. The valuation of the corn crop in Illinois, as given in the year book of the Department of Agriculture for the year 1903, was $95,000,000. Counting the proportionate loss therefore, which might have been prevented by proper testing of seed corn, we have $8,369,500. The data herein presented certainly justifies the conclusion that such a sum could have been saved by Illinois corn growers the past year by properly testing seed.

To bring the matter as closely home as possible to the individual farmer, suppose that he raises 80 acres of corn, and that his normal yield is 60 bushels per acre, giving a total of 4,800 bushels. His average loss this year was 8.81 per cent of that amount, or 422.88 bushels. Valuing this at 40 cents a bushel, we have a loss of $169.15 due to the use of untested seed. This amount would pay the necessary wages for testing every ear of seed corn which would be used on 7,555 acres of land, counting the wages at $1.50 a day. These figures ought to appeal not

so much to our seed dealers as to farmers and corn growers. They are the people directly interested.

Having determined the data above, it is not unreasonable to assert that every corn grower ought to know beyond any peradventure, just what kind of seed corn he pours into his planter boxes at planting time. We do not mean to urge anything unreasonable, and we are not doing so. If we were to test say 1,000 ears of seed corn from a seed house and found them to grow perfectly, we would be ready to admit that the next 1,000 ears were reasonably safe for seed, providing they were the same kind of ears, kept under the same conditions as the first 1,000 had been; but we would not take too much for granted.

The object toward which we are all striving, is that agriculture be made an exact science. The testing of each ear of seed corn, whenever necessary, will certainly be a considerable stride in that direction.

CORN.

PREPARING THE GROUND, PLANTING AND CULTIVATING THE CROP.

(Prof. P. G. Holden, in "Successful Farming.")

There is no one best method suited to all sections, nor to the different soils of a given section, nor even to the different fields of the same farm.

Frequently two very different methods may give equally good results. There are no "iron clad" rules which can be followed blindly in the growing of corn any more than in any other farm work. Have good ground, do the work on time and do it thoroughly, should be the object of every corn grower.

IMPORTANCE OF GOOD GROUND.

Nothing can make up for poor ground. Too many are trying to grow corn on old "worn out" ground that has produced corn and oats for years. I met a man at an institute in Illinois who said in all seriousness that he was satisfied that the seasons were less favorable for growing corn than they used to be, as he could get no such crops as he formerly raised. It developed that he had grown corn for 17 years in succession on the same piece of ground. No wonder "the seasons were becoming less favorable."

Let us remember that it was only a few years ago that the land of the Central West was broken from the virgin sod, and because we

have been able to crop the ground continuously in the past is no assurance that it can be done in the future.

The fact is that the time is near at hand when we must pay greater attention to the fertility of our soil, to the conserving and restoring of the elements of plant food or we will soon be compelled to pay out millions of dollars each year for these elements in the form of commercial fertilizers as is now done in the east.

The tremendous importance attached to this question cannot be appreciated by those who have had no experience in using commercial fertilizers in the older settled parts of our country.

What is needed is more clover, better use of the barn yard manure and less of the continuous cropping with corn and oats.

FALL PLOWING FOR CORN.

There is a great diversity of opinions regarding the merits of fall and spring plowing, even in the same neighborhood. Among the advantages of fall plowing may be named the following points:

1st. The work can be done at the slackest time in the year when both men and teams would otherwise be idle.

2nd. Having the ground already plowed in the spring gives us time to better prepare the ground and what is of equally great importance, to get our corn in on time.

3rd. Better prepared and warmer seed bed and consequently a better stand of corn.

4th. Less danger from insect injuries, especially in the case of sod ground.

5th. Weeds are prevented from seeding and the seeds already in the ground will mostly germinate and be killed by the fall freezes before seeding. This is especially true of early fall plowing.

DISADVANTAGES.

1st. Occasional losses from blowing and washing.

2nd. Unless the ground is disced early in the spring there is loss of moisture and a consequent "firing" of the corn during the latter part of July and August, especially in dry seasons.

3rd. The fall plowing does not give as good an opportunity to spread manure during the late summer and through the winter.

During the past year the Soils Department of the Iowa State College conducted experiments with fall and spring plowing in different parts of Iowa and in every case the yields of corn were greater on the fall plowing than on the spring plowing. While the evidence is generally

in favor of the fall plowing in the corn belt, yet the difference will generally not be as great as indicated by this year's results. The mistake is commonly made of leaving the fall plowed ground without discing until time to plant. The ground has become packed by the snow and rain and should be disced or at least harrowed as soon as the oat seeding is over. This will conserve the moisture and prevent the "firing" of the corn in August, so common on fall plowing.

Ground that is very rolling and likely to wash should not be plowed in the fall. Early fall plowing is generally advisable where the stubble ground is very weedy.

In the corn belt where the area put into corn is large and the corn planting period is short it is the best kind of management to fall plow all stubble and sod ground.

We should bear in mind that one of the most serious losses each year to the corn crop is due to late planting. The experiments show that late planted corn seldom yields as much as the earlier planted corn and the quality is inferior. The ground becomes hard and out of condition, the weeds have drawn upon the moisture and available plant food, the corn comes to the dry spell in August at a more critical stage, and it matures slowly, contains more water and is much more likely to be caught by frost.

Every year there are thousands and thousands of farmers who lose heavily from late planting. Many of these are good farmers, but are unexpectedly delayed with the spring work by a combination of bad weather, sick horses and scarcity of help.

This matter of readiness in the spring is of great importance in the corn belt and is made all the more so because it is practically out of the question to secure outside help at this time.

As stated above, it is generally advisable to plow stubble ground early in the fall.

1st. The weeds which have started will be prevented from seeding and the weed seeds will be brought near to the surface where they will germinate and be killed by frost before seeding.

2nd. This second growth of volunteer of oats, weeds, etc., will protect the ground during the winter and keep the soil from blowing. The late fall plowing has no such second growth and blows worse in the winter.

3rd. There is more spare time for the work. If the stubble ground is left for late fall plowing it is apt to crowd the plowing of the sod over into the spring, which is bad practice generally.

The reasons for plowing sod ground in the late fall are:

1st. It gives us the benefit of late summer pasture, and in case of clover a second crop for seed or for turning under to enrich the ground.

2nd. It is the best possible place to spread the barnyard manure, as there is least danger of washing or leaching.

3rd. The ground can be much better prepared and with less work than when plowed in the spring.

4th. There is much less danger of damage from cutworm and other insects.

It may sometimes be advisable to leave some ground for spreading manure during the winter. In this case it better be the clover sod rather than the timothy or the bluegrass.

Where clover is seeding with the oats or barley for fertilizing purposes or where rape is sown in the oats for fall feed it will of course be necessary to plow late in the fall.

BETTER ATTENTION TO FALL PLOWED GROUND.

The fall plowed ground is generally neglected in the spring and left to dry out and the weeds are left to get a good start, robbing the ground of moisture and food. Not only should the fall plowing be disced as soon as the oat seeding is over, but the corn stalk ground as well. When corn stalk ground is disced early in the spring the moisture is saved, the stubs and stalks are cut up and mixed with the soil and as a consequence bother less during the cultivation, and a better seed bed is secured. If not disced, the surface is turned to the bottom of the furrow in a lumpy condition, where neither the harrow, disc or cultivator can reach it.

SPRING PLOWING.

We often abuse our spring plowing by turning it up to the sun and dry winds to bake and dry out, depending on a shower to mellow up the ground at planting time.

It is a good rule never to leave the field either at noon or at night without first harrowing the ground that has been plowed. In my estimation no ground can be properly prepared, giving a good seed bed for corn without the use of the disc. A half prepared seed bed means a poor stand and an uneven growth and the corn will suffer more from drouth and from insects.

DEPTH TO PLOW.

What is known as deep plowing is generally not advisable in the corn belt, although the loose soils and bottom lands may be plowed much deeper than the black prairie soils with less danger of bad results. There

is seldom any advantage in plowing more than six inches deep either in spring or fall. If ground is to be plowed deeper than formerly it should be done in the fall. On heavy soils the bad effects of too deep plowing are often apparent for several years.

TOO DEEP PLANTING.

Too deep planting is especially bad when the seed is weak, and the spring cold and backward. When the ground is not well prepared or is very mellow there is danger of putting the seed down four or five inches, when two inches would be better. Especial care should be taken in case of early planting when the ground is still cold.

I know of several cases last spring where the same seed was planted in two different fields, giving a good stand in one case and a very poor stand in the other. Investigation showed that the poor stands were due to deep planting. Corn is generally planted deeper than we think. The planter wheels frequently sink into the ground two or more inches and the corn is covered another two inches. The planter tracks are then filled by harrowing and the corn is often more than four inches deep. We often watch the planter carefully for a few rounds when we start the planter and then pay no more attention to the depth of the planting. The soil is generally mellower as we get away from the head land and consequently the corn is planted deeper than we supposed.

STRAIGHT ROWS AND EVEN CHECKING.

The yield of corn is often reduced and the work of cultivation made difficult and slow, because of carelessness in handling the planter. Uneven checking may be due to several causes. In the case of short fields we generally draw the wire too tight and the planter checks too quick both ways. On long fields we are apt to check ahead owing to the slack of the wire, and this is especially true where the tongue of the planter is raised too high and the team fast.

In the case of irregular shaped fields, the checking is frequently bad. This is especially true where the ends of the field are not at right angles with the rows. In this case there will be a jog every four rows, depending on how much the field is out of square.

Carelessness in setting the anchor is the cause of much poor checking. It is a common practice to draw the wire to about a certain tightness at both ends of the field. It is a much better plan to always set the anchor on line at one end of the field, while at the other end the anchor should be drawn to a certain tightness.

CULTIVATION.

It is not possible at this time to go much into details, and of course methods will vary greatly with local conditions, but there are a few things of importance often overlooked.

Many think that there is nothing more to do after the corn is planted for two weeks until it is up and large enough for the "first cultivation."

There are others who believe in harrowing and even in cultivation before the corn is up, but on account of the pressure of work, neglect it. Where ground is left in this manner for two weeks and often longer, it becomes foul with weeds, which take up moisture and plant food and make it difficult to work the corn. The ground is packed by the rains and baked by the sun, until it becomes hard and dry; that is, "out of condition."

It is especially important in the case of corn that it should not be stunted when young, as it never fully recovers even under the most favorable conditions.

We should keep a good, mellow, lively tilth until the corn shades the ground, preventing the rain and sun from beating upon it, making it hard, dry and mealy.

The time to kill weeds is before they come up and before they have deprived the corn of moisture and nourishment.

Where it is possible to do so it is a good plan to cultivate the corn once before it comes up, following the planter with the harrow. If the piece is small so that the cultivation can be finished before the corn breaks through the surface, it is well enough to wait until the field is all cultivated and then cross it with the harrow instead of following close behind the cultivator. However, in the case of large fields, it is best to follow the cultivator with the harrow.

It is a common practice with some to harrow corn after it is up, but I prefer to cultivate and harrow as described above and especially on corn stalk ground. Even on stubble ground the harrow does considerable damage to the young corn. No one can afford to do less than to thoroughly harrow the ground before the corn comes up. It is a serious mistake to let our corn ground once get out of condition in the spring.

It is also a very common mistake to cultivate shallow when the corn is small and lay it by with a deep cultivation. The reverse would be more profitable. There is little danger to the roots from deep cultivation the first time, and there is great advantage in going deep enough to secure a good mulch.

The following cultivations should be no deeper than is necessary to keep the ground clean. Many cultivate corn as though the roots went straight down instead of spreading out through the surface of the soil. It is very essential that we disturb the roots as little as possible when the corn is "laid by." We are very apt to feel that as this is our last chance at the corn, we must give it a "good laying by," and especially if the weeds have gotten a start.

IMPORTANCE OF THE PROPER CARE OF SEED CORN.

(M. F. Miller, in Circular of Information No. 19, Missouri Agricultural College.)

The low vitality of much of our seed corn is due to the fact that it is improperly cared for during the fall and winter months. If the corn is not thoroughly dry by the time hard freezing weather comes, its vitality is sure to be injured. It makes little difference how low the temperature may fall if the corn is perfectly dry, but any hard freezing when the corn is damp will weaken its vitality and even prevent the germination of many kernels entirely. It is usually thought that if corn comes up, the vitality has not been injured, but experiments have shown that corn stored in the crib will not only produce less vigorous stalks than those from corn that has been properly cared for but will fail to make as much corn per acre under exactly similar circumstances, the difference running from 4 to 16 bushels per acre, depending on the season. These figures should convince any one that the proper care of seed corn offers one of the simplest and most important means of increasing corn yields. If we allow an increase of 5 bushels per acre (it will usually be much more than this) on a crop of 50 acres, the extra yield would amount to 250 bushels which at 35 cents is worth $87.50. The extra time necessary to properly care for the seed would not be over a day and the expense of putting up drying racks is very trifling, as they may be made of any sort of lumber.

Plant Corn of Strong Vitality.—The failure to plant corn of strong germinating qualities is undoubtedly responsible for the greater number of poor stands of corn. The matter of getting a uniform distribution of seed is but secondary to the more important factor, that of planting only corn which is known to be of strong vitality. Germination tests which have just been made at the experiment station with a number of samples of corn from farmers' cribs around Columbia, show an average germination of but 63½ per cent. This means that there will be a great deal of corn in the State this spring of weak vitality, and unless proper

precautions are taken to test such corn before planting, very poor stands will certainly result. If only corn of strong vitality were planted, with due consideration to securing a uniform distribution of seed, the stand on average seasons should not run much under 95 per cent. Such a stand means a long step in the direction of a profitable corn crop.

Test the Vitality of Corn in a Germinating Box.—It is perfectly practical for the average farmer to test for germination every ear of corn he plants, and where corn has not been carefully preserved this should always be done. It has been found that if an ear is lacking in vitality, the character is shared to a great extent by the majority of the kernels on that ear; consequently if a half dozen kernels are selected from different parts of the ear and tested, a very good idea of the strength of germination of that particular ear may be obtained. The method of doing this is as follows: Lay out the ears selected on a long board or on the crib floor, marking a number opposite each. Prepare a box two

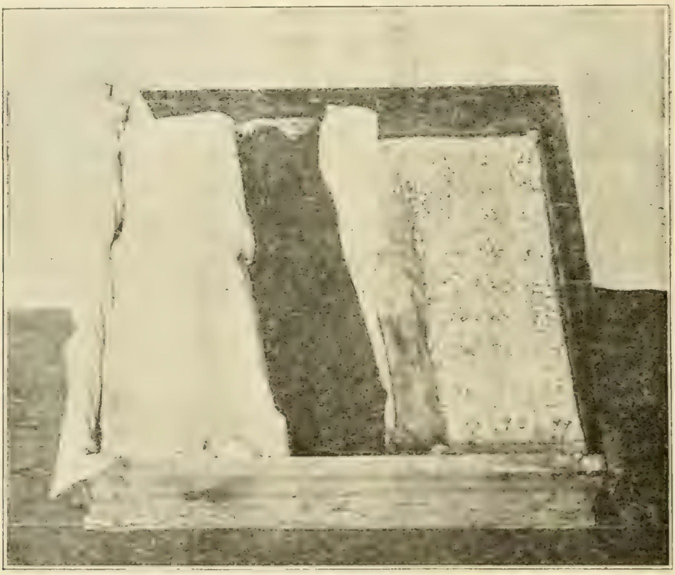


Figure 2.

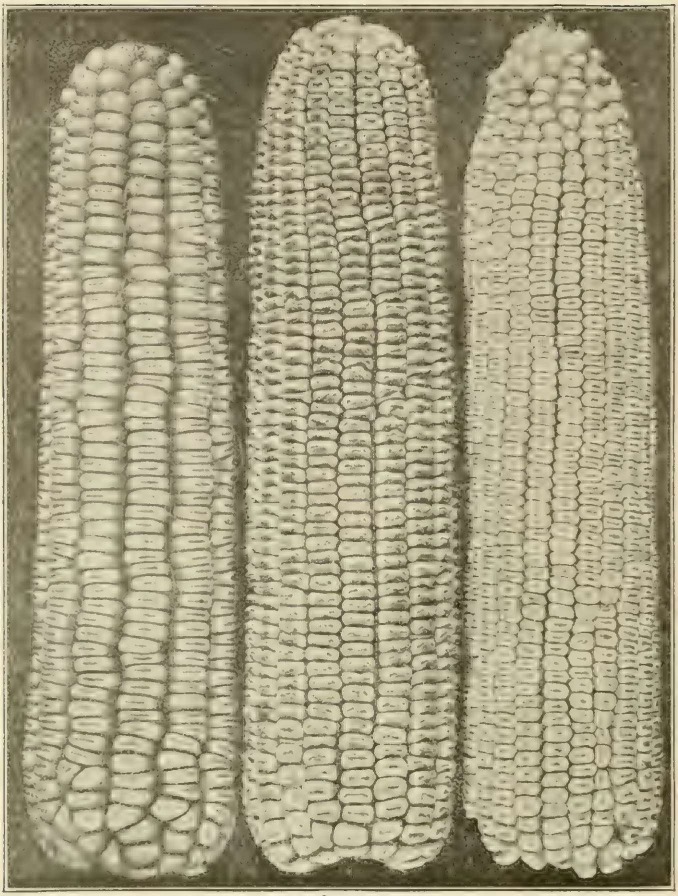
Germinating Box. The cloth on which the sand is placed is rolled back to show the squares holding the corn.

or three inches deep and two or three feet square (Fig. 2) nailing the bottom on tightly in order that it will not warp when it becomes wet. Place in the bottom of the box a half to three-quarters of an inch of sand and moisten thoroughly. Cut a piece of white cloth to fit the box and mark it off with a pencil into squares 2 to 2½ inches in size, numbering them from one up, laying the cloth on the sand. Now remove two

kernels about two inches from the butt of ear No. 1, turn it one-third around and take two more from near the middle, again turn it one-third around and remove two from near the tip, placing the half dozen kernels in square No. 1. In like manner take the same number of kernels from ear No. 2 and place in square No. 2 and so on until all the squares are filled. Cover the corn with another piece of moist cloth, which is somewhat larger than the box, filling in on top of this with three-quarters of an inch of moist sand. A piece of oilcloth or some wet paper thrown over the top helps to keep the germinator from drying out. Set in a warm place, say near the kitchen stove where the temperature will stand from 70 to 90 degrees, and allow it to remain about a week, moistening the sand occasionally if necessary and noting the progress of germination from time to time. At the end of this time the kernels of good vitality will have sprouted strongly and one can tell by looking at the different squares which ears are to be discarded for seed. For instance, if ear No. 10 shows a tendency to weak germination, or if one or more of the kernels failed to sprout at all, such an ear should be thrown out. It will be found in ordinary crib corn that a large per cent of the ears will have to be discarded entirely. The ordinary practice of planting such ears is responsible for most of our poor corn stands.

The time necessary to do this testing is very trifling compared to the money return which it will bring. By such a test, if one is depending upon the crib corn for seed, a most conservative estimate is that the stand may be increased five per cent which should mean two bushels more corn per acre, where the average yield is 40 bushels. The actual time necessary to test sufficient corn to plant 50 acres in this way is not over two days and a little figuring will show at once the income which such work will bring. The germinating box costs practically nothing and if one wishes, several may be run at once. Probably the most convenient size is one two feet square, which will test about one bushel of corn. Another method of arranging this germinator is to use instead of the sand, layers of wet paper, or sometimes bran is used, but the sand is probably the most satisfactory.

It should be said that where very careful attention has been given to drying out and preserving the seed corn it should test as high as 95 per cent of the kernels germinating strongly. In such a case it will probably not be necessary to test each individual ear that is planted, but rather to test say ten kernels from fifty representative ears. Some test, however, should always be made before planting, to be sure that the corn is of strong vitality.



Ears showing variation in the shape and size of kernel

Methods of Preserving Strong Vitality.—The best method of preserving corn is to spread it out in shallow layers or in small piles in some well ventilated room until dry, then transfer it before freezing weather to a dry room where a moderate temperature is maintained throughout the winter. If such a room is not available, build a series of rough board shelves or open racks in any well-ventilated room where the corn will dry out rapidly and remain dry. Another method is to hang the corn on binder twine or wire in a dry room. (A good seed corn rack is made of 2 by 4 uprights upon which are nailed 1 by 2 inch strips to hold the corn.)

Corn should never be piled in large piles or placed in tight barrels or boxes until perfectly dry, neither should it be placed when moist in a warm room, as in either case the vitality is liable to be injured by a tendency to heat or sprout. Again, corn which is thoroughly dry, if

subjected to a moist atmosphere, may absorb water in sufficient amounts to be injured by a hard freeze. It is never desirable, therefore, to store corn over a stable because of the moist air arising from the stalls. Any method by which the corn *is dried quickly and kept dry will maintain its vitality.*

CHARACTER OF GOOD SEED EARS.

There are certain characteristics in ears of corn which indicate high yields per acre and which the corn grower should observe in selection. Some of these are based on the observations of both practical and scientific men, others are more or less theoretical. We must maintain certain ideals if we are to improve our corn as we have improved our live stock. It will be understood that the purpose for which corn is grown will influence largely the ears to be selected but the characters mentioned here are those which deal simply with yield of shelled corn per acre.

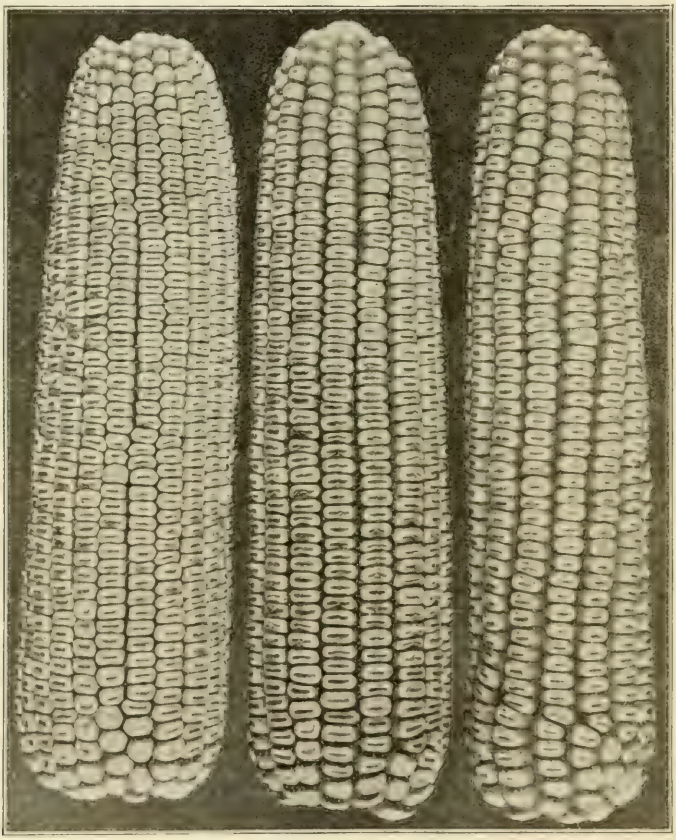
Shape of Ear.—The best shape for an ear of corn is as nearly cylindrical as possible. This is desirable for two important reasons. In the first place, a tapering ear usually means a less amount of shelled corn to the cob, than if the ear is cylindrical; it means either shallow grains near the tip or the dropping out of rows, neither of which is desirable. The second reason for selecting cylindrical ears is that such an ear bears kernels of nearer uniform shape and size than the tapering ear, thus giving a more even distribution of the seed by the planter. It will be understood that ears perfectly cylindrical can rarely be found but those that are nearly cylindrical are the ones to select.

Proportions of the Ear.—The proper proportion of length to circumference in an ear of corn is about 4 to 3, or the circumference should be ¾ the length; that is, an ear 10 inches long should be 7½ inches around at a point one-third the distance from butt to tip. It is rarely desirable therefore to select the longest ears that can be found, neither is it wise to select the shortest ones, when shelled corn per acre is wanted. It is a common opinion among farmers that the very long ears are best, but the experience of corn breeders has not shown this to be true when a series of seasons is considered. Where the corn is to be fed on the stalk it may sometimes be advisable to select the shorter ears when two occur on a stalk, but this would not apply to the case where a high yield of marketable corn per acre is the object.

Space Between Kernels.—It is rarely desirable to select corn with wide spaces between the rows either at the tips of the kernels, or at the base next the cob. The space between the various kernels in the individual row should be small, so that the ear will be solid and compact. The flint varieties of the northern part of the United States show the

wide-furrowed character, but for Missouri we should select the more compact ears, ears in which there is just as little lost space as possible. Reference to the photograph will show what is meant by wide and narrow furrows between rows. The ear on the right shows very wide furrows, the one in the middle a medium width and the one to the left very narrow space between the rows.

Butts and Tips.—The butts and tips should be well filled out with deep regular kernels. This is important because it gives more corn to the ear. The characters of the butt are more important in determining the ears to select than those of the tip since they are capable of being transmitted with greater certainty. The tip of the ear is affected quite largely by season and soil conditions or it may be injured during pollination, thus preventing a proper filling out.



Ears showing a variation in space between rows.

The kernels at the butt should be uniformly and compactly arranged about a clean cup shaped depression, the diameter of the scar where the shank was attached being about three-fourths of an inch in diameter for

medium sized varieties. If the butt is too small and contracted, many of the ears will blow off or they will be knocked off in harvesting with a corn binder. Too large a butt makes the shucking difficult and is an indication of poor breeding and careless selection. Well bred corn is usually shown by the character of the butts of the ears. In Fig. 4 the middle ear shows the best butt. The one on the right is large and coarse, the one on the left too small.

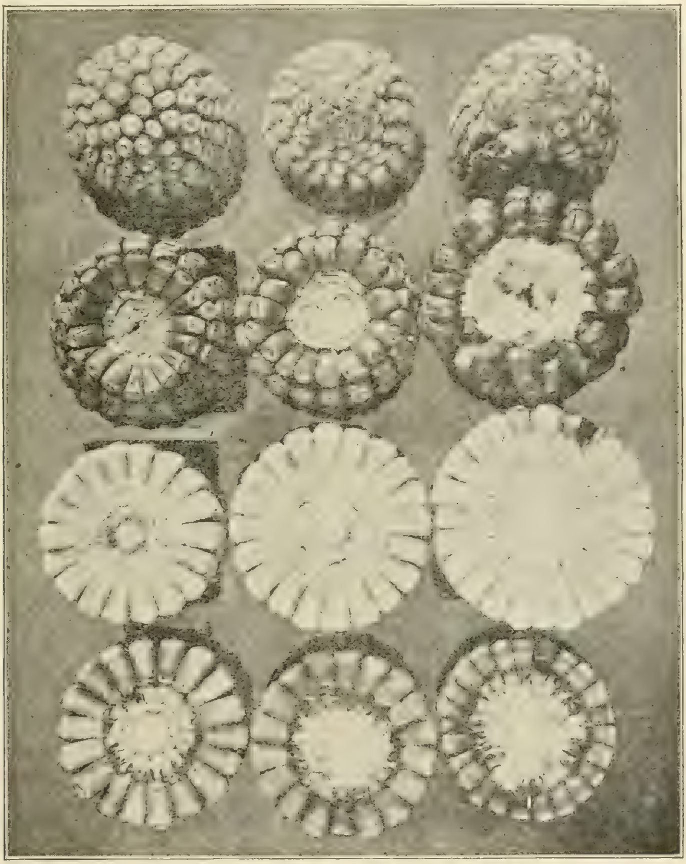


Figure 4.

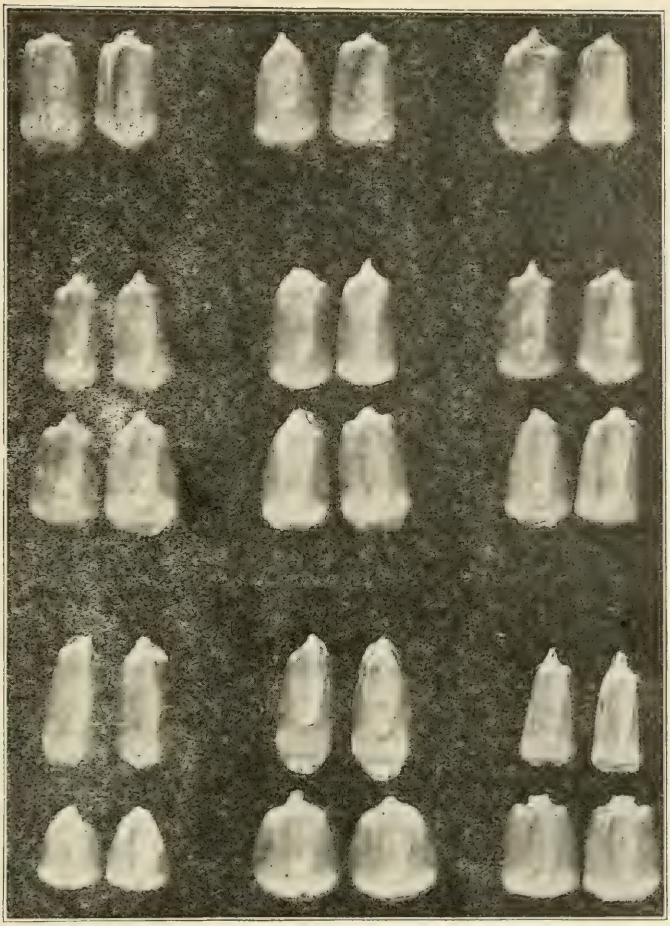
The tip on the left in the top row is ideal, the one in the middle is good and the one on the right is poor. The butt on the left is too small, the one in the middle very good, the one on the right poor. The cobs on the left are small, those in the middle are good, those on the right are too large.

The tips should be as nearly covered with deep, well-formed kernels as it is possible to get them and still maintain an ear of proper length. A well covered tip is a character usually observed on the shorter ears; consequently if one selects primarily for covered tips there is danger of shortening the ears beyond a profitable limit. It is better to have a good

sized ear with a tip not completely covered, than a shorter ear with a covered tip. Of course if a well covered tip can be secured on an ear of the proper length that is ideal, but there are so few long ears which show this characteristic that it is usually impossible to secure enough of these for seed. It is therefore better to select for deep, regular kernels well out to the end of the ear than for kernels over the end of the ear. For show corn, however, the more nearly covered the tip, providing the length is maintained, the higher the score. In Fig. 4 the tip on the left is ideal, the one in the middle is good, the one on the right rather poor.

Size of Cob.—The prevailing opinion among farmers is that the smaller the cob the better. In general this may be said to be true, although there is a limit beyond which it is not profitable to go in the matter of reducing the size of the cob. It has been well said that the cob bears much the same relation to the ear of corn as does the bone to the beef animal. The animal must not be coarse boned, neither must it be fine boned, a medium bone of clean quality being much preferred to either. Likewise in corn we should select for a medium sized cob rather than for a large or very small one. Large cobs usually mean shallow grains and a coarse appearance. They do not show high quality. A very small cob tends to narrow pointed chaffy grains which are very often loose on the cob and uniformly lacking in vitality. What is wanted is a goodly number of straight, well compacted rows and sufficient cob must be maintained to bear them. In Fig. 4 the middle ears show the best sizes of cobs, the ones on the left being too small, those on the right too large.

Shape of Kernels.—The proper shape of a kernel is one a little over one and one-half times as long as wide, of a straight, wedge shape, but not pointed. It should be of good thickness and while not wide at the end next the cob, it should still be well shouldered out, giving room for a strong, plump germ. In the accompanying photograph the two rows of kernels at the top are poorly shaped, those in the top row being too shallow and those in the second row too long and slim. The shallow ones will give a low per cent of corn to the cob while the long slim ones indicate weakness and low vitality. The two rows near the middle show the best shapes. They differ somewhat in appearance but represent very well the characters to be observed in selection. The kernels in the lower row show a difference in size of germ. Large germs are desirable in seed corn for two reasons; first, because such kernels usually have strong vitality and second, because they have a higher feeding value. A large proportion of the oil in the kernel is found in the germ so that the larger the germ the higher the per cent of oil. By noticing a num-



The two upper rows show poor shapes of kernels, the two rows near the middle are good shapes, and those in the lower row different sizes of germs.

ber of ears it will be found that while there is often quite a difference in the size of the germs in the kernels of the same ear, yet as a rule they tend to uniformity in size, some ears having large germs, some medium and some small. It is well, therefore, to select ears which show large strong germs, especially when the corn is being selected for a breeding plot.

EIGHTH ANNUAL MEETING

Improved Live Stock Breeders' Association

(Convened in Agricultural College, Columbia, January 12 and 13, 1905. Held under the auspices of the State Board of Agriculture.)
Abstract of Addresses Delivered

PRESIDENT'S ANNUAL ADDRESS.

(Benton Gabbert, Dearborn, Mo.)

We have in our program some subjects that will be a delicious treat coming from practical men engaged in the calling they propose to discuss. The life of a meeting of this kind is in the exchange of ideas; in the discussions of the papers presented; and in the discussion of the methods and manner of doing things. It is the doers and not the theorizers that have the public ear and the public confidence in these strenuous times. The doers—the men that make a success, are the ones we want to hear from, and the man in this company who remains silent when he knows or wants to know something is injuring himself and others.

At our last annual meeting the papers read were hopeful. I thought we had reached bedrock in low prices for pedigreed stock, but I find that the four beef breeds have this year lowered the record fully one-third from last year, and more than two-thirds from 1902. This is a statement from the Breeders' Gazette of cattle sales.

AVERAGE NUMBER OF CATTLE SOLD AT EACH SALE.

Name of Breed.	1904	1903	1902
	Number of cattle sold at each sale.	Number of cattle sold at each sale.	Number of cattle sold at each sale.
Shorthorn	42	50	57
Hereford	51	67	83
Angus	44	74	62

COMPARATIVE AVERAGES BY YEARS.

Name of Breed.	1904			1903			1902		
	No. of sales.	No. sold.	Av'e price.	No. of sales.	No. sold.	Av'e price.	No. of sales.	No. sold.	Av'e price.
Shorthorn	65	2755	$101 25	89	4474	$174 15	120	6152	$260 40
Hereford	28	1481	117 10	30	2029	172 50	31	2597	265 70
Aberdeen-Angus............	21	962	132 80	14	1041	220 15	17	1065	259 80
Galloway......................	3	133	143 55	3	161	116 10	3	206	185 15
Polled Durhàm..............	7	286	100 00	8	282	155 55	5	159	221 95
Red Poll........................	1	48	70 00	1	22	145 00	2	149	248 00

From this statement we see if they fall in the same proportion for two more years thoroughbred cattle will be below cost of production for breeding purposes. John Stuart Mills, the great political economist, lays down a rule, that holds good in most cases—that supply and demand regulate prices—that when an article falls in price below the cost of production, production will fall away until profitable prices are reached. The sales above would prove that the sales of registered cattle have diminished in numbers to correspond to fall in prices. This falling in numbers would indicate one of two things: either the cattle have remained in the herds, or have found some outlet to other markets. I think the latter is the case. I believe that the prudent breeder is pruning down his herd by sending to the shambles the undesirable breeding stuff; retaining the cream for future use. So the darkest cloud has its silver lining. If we cannot improve at low prices the scrub herds of the farmer and ranchman we can improve our thoroughbred herds by judicious culling. No thermometer has yet been found that will apply to registered cattle. If the public were thoroughly awakened to the fact that a thoroughbred sire would add twenty per cent to the value of their scrub herd the demand for blooded sires would increase, when cattle at the stock yards fell in price. But the thoroughbred seems to be at the long end of the pendulum, when beef cattle rise the thoroughbred rises too high, when beef cattle fall the thoroughbred falls too low. But one potent fact is eliminated from the fall and rise in cattle; that the butcher's block is the seal test. The sales of high grade steers at the markets is more eloquent for good blood than all the breeder shows, and the strongest advertisement for thoroughbred herds for the year 1904, and to the intelligent feeder will bear fruit for a future harvest, and create a market for pure bred sires among the men who raise the stockers.

The packers are the basic cause of the rise and fall in prices for our

registered cattle. Consumption has but little to do with the price, for the price paid for cattle on foot has no relative ratio to the price the retailer sells to the customer, or the price the retailer pays to the packer. The long headed packer, years ago, studied out the problem that the private butcher was a menace to his business and by a systematic freezing out process eliminated the butcher. But one fact now remains to keep the packer from having absolute control of the markets, both in buying and selling, and that one factor is organized labor. Whether the unions are a blessing or a curse to the cattle raiser and feeder is an unsolved problem. Cattle last year just before the strike were slowly advancing and all who were interested in raising or feeding cattle were hopeful that the cattle business was coming back to a paying basis. The strike was peculiar. The skilled workmen were satisfied with their wages, but in a spirit of brotherly kindness, at the expense of the packers, they demanded higher wages for the unskilled laborer. The packers naturally refused. Then the tie-up in business. The packers could take but a limited supply, could not fill their orders, consumption fell off, people found that they could live without meat and feel good on a cheaper ration, but this state of affairs hurt the cattle raisers and cattle feeders in the pocket book, the most sensitive and vital part of business. The unions lost out, for public sentiment was against their generosity for their fellow laborers, in calling out their men to help force the packer to pay, not them, but their unskilled brothers higher wages, and the union of skilled labor getting the honor for the generous deed, put me in mind of a story related by Rabelas. A cook was roasting a goose in a little alcove on the street. A laborer passing along at the noon hour and seeing the warm grate and smelling the rich flavor of the goose, took out a large loaf of bread, his only dinner, and would break off a piece and hold it over the goose. The fragrant vapor both warmed and flavored his dry bread and he enjoyed the comforts. When he had finished his meal the cook demanded pay, but the laborer refused. Why, he said, the vapor was floating away and was of no account to you. But said the cook, did it not help your bread? Yes, replied the laborer, but I have not wronged you. While they were disputing a crowd gathered. Finally the cook said that they would leave the case to be settled by the town fool—both agreed. We have such a one in every town. We call him the town wit or wag. You have all met him. One who sees the comic side even in tragedy, and turns the most sorrowful woe into a smile of joy; one who sees the truth in a cloud of bog and can scientifically turn on the X-ray. Well, says the wit to the laborer, you got the vapor from the goose, it flavored and warmed and moistened your dry bread and made it eat good. Yes, responded the laborer.

Have you a coin about you, asked the wit. Yes, said the laborer and handed him a new coin. The wit went up to the metal counter and rang the coin. "Is that good money?" he asked the cook. "Yes," responded the cook. "Well, you are paid," said the wit. The laborer has had the vapor of your goose and you have had the ring of his coin.

In the case of the strike the packers had the vaporings of the union and the strikers failed to get even the ring of the coin, and the cattle raisers and feeders suffered more or less than either. We undoubtedly held the bag.

Before leaving this subject of the packing industry, I would ask my hearers if they have not read two articles published in Wallace's Farmer of December 22 issue, to get the paper and read them. One is by ex-Governor Larabee on the railroads and the other by A. L. Ames, president of the Meat Producers' Association, both of Iowa. The former emphasizes the fact that competition can no longer be depended on to regulate freight rates. That the government must have the power to regulate the freight rates, or the government must own the roads. He says no other, even half civilized country, would tolerate such high-handed robbery, as less than half a score of irresponsible persons dictate and control the traffic and tax every business for their profit. We know that the greatest bar to distributing our thoroughbred cattle is the excessive freight rates imposed. At the World's Fair the good lot of cattle sold by the different breeders was discounted in price fully one-fourth by the buyers having to pay such excessive terminal charges to get the cattle from the fair grounds to the roads over which they were to be shipped home.

Mr. A. L. Ames speaks of the longer time it now takes to get beef cattle shipped to market and the rebates that Swift and Armour get in their shipments, proving that the two, the transportation and packing companies are in collusion to collect tribute from the shippers. The shrinkage in these dilatory hauls takes money out of the shipper's pocket and puts it in the packer's safe. This all proves that the breeder has other work to look after besides raising good stock.

We now ask the question pertinently, is there any sentiment in business traffic, commerce or trade, or any other name you may call the distribution of products? I assert that the golden rule or the decalogue has little place in modern business methods. I know I may be censured as strongly as was Senator Ingalls of Kansas, in his travesty on modern politics, yet the history of the industrial world bears me out in my assertion. It seems to be every fellow, or combination of fellows for themselves, and the devil take the hindmost. It is war to the knife and from the knife to the hilt. Why are the agriculturists com-

ing to the front? Why are the hayseeds of the past becoming the gentlemen farmers of the present? Because his products feed and clothe the world. Because his products form the basis of manufactured goods. Because the balance of trade is alone kept on the right side of the ledger by the exportation of his products. The transportation companies would have to quit business, the railroad stocks would go begging and Wall street would be in sack cloth and ashes, and yet they pinch us and rob us and despoil us. The old adage is indeed a truism, "if the farmer prospers all the world prospers." We want the world to prosper, but fair play is no robbery. All we ask is fair play. We do not want to be held up for all the traffic will bear. We ask that the interstate commerce commission be given power to regulate rates; that they may act as umpire between the colossal corporation and the smallest shipper. If we ask for bread they will give us a stone, but if we demand it as our right, and insist on our rights, the gentleman farmer will get them. From 1888 to 1898 the commissioners exercised the right as they understood the law to enforce their decisions, but some shrewd corporation lawyer brought a test case before the Supreme Court and our highest tribunal decided against the commissioners and the people and for the railroads. Since then the commissioners have been powerless, only to suggest, and it leaves the people at the mercy of the railroads, and although, as ex-Governor Larabee says, the people have paid tribute to the railroads above a legitimate price, to make the people the virtual owners of the roads, and we believe this statement is true, for the railroads have ever and always issued bonds to build the roads, at a rate of interest that insured the selling of the bonds for cash, with which they built the roads and bought rolling stock. The excessive tribute wrested from the people has paid the bonds, and the roads have recapitalized their stock, or in common parlance, watered their stock fourfold beyond its actual cost, and the end is not yet. But some may not think this a legitimate subject for the President of the Missouri Fine Stock Breeders' Association, but the whys and wherefores of the unprecedented fall in pedigreed cattle leads us to seek the cause, and to demand a remedy. We have been hewers of wood and drawers of water in the years agone. Now we demand equal rights for all, especial privileges to none.

The corn growers have been entertaining and instructing us. A clipping from an article by Prof. B. T. Galloway, chief of the bureau of plant industry in the Youth's Companion. The article was on Intensive Farming, and speaking of openings for young men claims the raising of seed corn the most promising. To quote him, there are annually raised about two and a half billion bushels of corn in this country,

grown on ninety-five millions acres of land. To plant this crop requires about fifteen million bushels of seed. The average yield is about twenty-five bushels per acre, but in many places the yield will run fifty to seventy-five and even one hundred bushels per acre. Now there is not the least doubt that the corn crop could be increased twenty-five per cent by the use of high-grade pedigreed seed. The growing of this seed as a specialty is one opening for the right kind of young men. The time will come when farmers will find it to their interest to pay two dollars or more a bushel for high-grade seed rather than attempt to grow it themselves. The breeding of this seed is a science into which every young man should look, and if he finds out what there is to do and does it right he will have no trouble in disposing of his product. We ought to have two million bushels of this kind of seed available to-day. As a matter of fact, we do not have any to speak of, although the work has already been taken up by a few energetic people. Do you corn men believe that you can increase the yield 25 per cent over the mongrel seed we cattle men and farmers are using? If you believe it, can you demonstrate it with facts? Then if you can we are very foolish to use the corn crib mongrel seed. But how slow we are to take hold. Just as slow as you corn seed growers are to take hold of our cattle. We know that a thoroughbred sire will add to the value of a scrub herd fully 25 per cent.

In the same connection Prof. Galloway says: "If we need this sort of work for corn we need it much more for cotton; the great staple crop of the South, which annually brings to the country five hundred millions of dollars. The twenty-five million acres devoted to cotton requires twenty-five million bushels of seed. The breeding of cotton seed for special purposes, for special localities and for special needs has hardly begun." But if the cotton seed man could increase the yield of cotton, would he be a public benefactor? This year the yield is in excess of the demand, and the burning baled cotton at Fort Gaines, Georgia, to place cotton on a paying basis proves that the man that makes two bales grow where one grew before is only adding fuel to the flame. The same means to enhance the price of thoroughbred sires has been advocated by many stock breeders, by sending all but the best to the butcher's block, but this always seemed to me like killing the goose that laid the golden egg. The farmer and the ranchman are the ones to whom we are to look for a market. We can afford a sacrifice in selling to them, for once buying a thoroughbred they become permanent customers and want better ones as they become educated. High-priced lands and high-priced feeds call for a better class of stock. Brother breeders, prices are low, but let us stand by our colors and raise the best

stock we can, and if our bank account is not so plethoric we can, with good grace, lay claim to patriotism and say what is our loss is our country's gain.

I had a letter from one of the best breeders in England and he sent me, along with that letter, a paper. He had a bull called Lord Roberts that he thought could win anything at the World's Fair. I wrote back and told him he ought to bring his bull over. This paper was one of the leading live stock journals in England and I looked it over. What was called quite a sale, a big run, was, all told, six thousand cattle of all kinds. This was an unprecedented sale. I wrote back to him: "Old man, cross the water if you have to come in a tub, and go to our cattle markets and it will be an eye-opener to you." This man was Wm. Tudy, one of the best cattle breeders in England. What a surprise it would have been for him to go to the Chicago market, for instance, and see thirty-two thousand head of cattle and hogs come in! They don't know that we have such a country and we hardly know it ourselves. We have made money easily because we had a fertile soil and while we are hampered by the railroads, it is because our eyes are not opened. If we were pushed to the bed rock and each man had only three or four bullocks and had to account for every penny that he made, we would wake up and attend to things. Undoubtedly we would see that the cattle markets were not controlled by the railroad men.

But the farmers are coming to the front because they are becoming educated. Our papers are being brought to our doors and the telephone and other things are waking up the farmers.

But these agricultural colleges are the colleges. I have as much veneration for the classic pile that stands before us as anyone. An education can hurt no one. It is a scaffolding on which one can climb higher. When you read a thing, you not only read it, but digest and assimilate it and understand it. But with an academic education, unless the boy has a marked talent for the calling for which he has educated himself, he will be a cripple all his life. He has nothing practical to which he can hold on. Failing in a profession, he can do nothing but teach school.

When our farmers have been educated in the agricultural colleges we will leave the old methods and follow new ideas. We will not only be the granary, but we will feed the world, and we will be the masters of the world. Other nations may build up their great navies, but if we farmers will build up our granaries, we can say to them, "we will shut off your feed if you fool with us," and we will be the masters of the situation, for the pocket-book rules the world.

We cannot with the widest scope of the imagination read the magni-

MEDDLER

Meddler, 99999, the undisputed Champion Poland China of the world's greatest hog show, St. Louis, 1904. "A perfect animal from the packer's standpoint." Bred and owned by Winn & Mastin, Martin City, Jackson county, Missouri.

tude of our future. We do not even know the magnitude of the present. There is hardly a farmer in this land but sends something to market. The good wife sends eggs and chickens. These little streams start from every farm and form little creeks and these little creeks form rivers which flow into the great channels and these form the great ocean of the markets. The commodities have come from all over the country. We are the greatest people in the world and we have her commerce. Our future is great if we awaken to our responsibilities.

"MORE LEAN MEAT AND LARGER LITTERS" DEMANDED IN THE POLAND CHINAS.

(W. B. Cully, Bunceton, Mo.)

The demand is one that we know exists, but the solution of the problem under present conditions is difficult. The present type of Poland Chinas is one that cannot be eliminated from the profitable production of pork where corn is the basis of all economic feeding operations.

The demand for more lean meat is an acknowledgement the Poland China will get fat. This is one of the foundation stones upon which the breed has been established. For his easy feeding qualities his popularity has, for over fifty years, held sway wherever corn is king. Some have ventured to suggest the bacon hog as the solution, but that suggestion has died in its utterance. In the first place the pork producers of the corn belt are not struck with his shape; secondly, time is too precious to produce him, and, lastly, the market demand would be limited, because it demands both meat and lard, two articles equally valuable.

The most perfect specimens of the breed today are veritable parallelograms of flesh. The waste is minimum when placed upon the block. The awards for grand champion barrow at our recent World's Fair were made by Mr. Ferguson, buyer for and representative of Swift & Company of Chicago, a man thoroughly familiar with the type and kind of hog in favor for the block. The Poland China barrow, Cricket, won the grand championship over all breeds. The trend of the market demand in the last few years has caused the evolution of the Poland China to the present type. A type that because of its time-saving tendency in pork production has added thousands of dollars annually to our agricultural wealth. To retain this profitable carcass, and still acquire more lean meat, is a problem that will admit of much experimental research.

Lean meat is the muscular flesh of the carcass, the growth of which is greatly encouraged by abundant exercise and food stuff rich in protein and mineral matters, foods that are within the reach of all pork producers, but of which so few avail themselves in sufficient quantities to balance starchy corn in their feeding rations. Until our markets offer greater inducements for more lean meat, we are certain our pork producers cannot profit by its production. But when they do, use of more feeds rich in protein will bring about the desired results, and as delicious meat will be produced from the Poland China in the corn belt as is produced with any breed in the agricultural world. As to the race suicide of the Poland China to a great extent the breed has been unjustly accused by both rival breeds and by those who have overlooked the fact that the Poland China sow is a great flesh carrier, and have failed to guard against the over-production of flesh during pregnancy. An exclusive corn diet during the winter months, especially, can result in nothing but failure to produce large, healthy litters. With the successful pork-raiser the diet of the brood sow is even more important before, than after farrowing. No matter what the breed, prolificness can only be maintained by intelligent mating and handling. It is also an hereditary characteristic and can be impressed on the breed through both sires and dams having a long lineage of prolific ancestors. Some breeds may boast of a larger litter production, but for the production of the greatest number of the most perfect specimens of the breed we can crown the Poland China sow queen of the porking species; for the greatest profit lies not in the greatest number of the species, but in the greatest number of the most perfect specimens of the breed.

To those who have mastered this, the most important branch of hog raising, the prolificness of the Poland China has not been the question. Given the same conditions under which other breeds have proven profitable, we believe the Poland China with his early maturity, prepotency and uniform excellence will prove even more profitable.

BUYING PEDIGREED SWINE ON MAIL ORDER.

(L. E. Frost, Moberly, Mo.)

I have no idea of even beginning to cover this topic, as it is one that is almost inexhaustible, but I trust some thoughts may be brought out that will start a discussion which will result in good to us all.

In buying pedigreed swine on mail order, we instinctively form a picture in our minds of the intended purchase, and frequently are some-

what disappointed when the animal is received. If we order a pig of any particular blood lines we, of course, have a good idea of the type, and form a picture in our minds from the description given by the seller. The pig may be, and generally is, all that the breeder has stated in his description, but having formed an erroneous idea of his appearance we are, of course doomed to some disappointment. Besides, different people are prone to see different things in a different light, and when the breeder was describing the pig he did not overstate the good qualities, but the animal perhaps appeared to him in a different light than to the purchaser. For instance, take the Berkshires shown at the World's Fair. Many competent judges did not agree with the judge who placed the awards, and yet the awarding judge, I believe, was thoroughly conscientious and competent, and placed the ribbons according to his judgment. If one had ordered the best pig of a certain class to be shipped him from those shown at St. Louis, he would have received the pig that nearest filled the ideal of the judge who was making the selection. If it had been Mr. A. he would have received a certain pig. If it had been Mr. B. he might have received an entirely different one, so that as long as men's ideals and judgment differ, there will be cause for argument.

One great trouble with many buyers of pedigreed live stock on mail order is their hesitancy to pay the price. A buyer writes to Mr. Breeder and asks him to describe and price, we will say three or four different male pigs. He sends a description of one at $25.00, one at $40.00, one at $50.00 and one at $100.00. The $25.00 pig is doubtless a good pig, but there is something about the $40.00 one that makes him worth more, although the general description of the two are about the same. This is true of the $50.00 and the $100.00 ones, and the buyer concludes that as they are all about equally well bred, and are all owned by the same breeder, that he will buy the one for $25.00. If he could have seen them all when he was making the purchase, he might have taken the $40.00 one, or the $50.00 one or the $100.00 one, and perhaps is not satisfied on receipt of his animal. I believe that the better plan would have been to have stated exactly what he wanted, and asked the breeder at what price he would sell such an animal. If the breeder stated $40.00 and he thought he could buy one equally as good from some other breeder for $25.00 he would have the privilege of buying from the latter breeder, but the chances are that the $25.00 pig would have been worth $25.00 and the $40.00 pig $40.00. I have found it necessary to pay the price if you expect to get the quality. Too many people expect something extra fine for little money, and cannot understand why one breeder will ask $40.00 to $100.00 for one small pig when he can buy the best that his

neighbor has for $15.00 to $20.00. Buying pedigreed live stock is like every other mercantile business, you must have confidence in the party you deal with, and must frequently allow the seller to influence you in making selection. To illustrate this point, I have for many years purchased tooth brushes from a party in St. Louis, and although I pride myself on some knowledge of what constitutes a good tooth brush, yet I am always glad to ask this party his opinion, and whenever I take his judgment I invariably get full value. I certainly use my own judgment as every purchaser should, but we must be willing to take the other fellow's judgment to at least some extent, and if we have not enough confidence in the party we are buying from to do that, we should buy our stuff from some one in whom we do have confidence. This is especially true with beginners, but I presume if I was as old and competent a breeder as our Mr. Gentry, Mr. Harris and many others that I could mention, that when I wanted to buy an animal out of some other herd, I would use my own judgment entirely, but if this is true with those breeders, it is the exception rather than the rule.

Of course, there is the other side to the question, and that is the breeder or seller should be very careful in his description. I believe our best breeders are, and if the general public become educated to the point where they are willing to pay the price for quality, there will be less dissatisfaction in buying pedigreed live stock on mail orders. I have found that the successful breeders are good business men and good business men do not misrepresent their goods. There is, however, a class of breeders who are perfectly honest, but whose judgment is bad. An intended purchaser may write the breeder of this class asking him for price and description of a certain kind of animal, and the breeder in sending description may unknowingly overdraw it. He does this from ignorance, and not from any intention to cheat. However, the damage done the buyer is just as much as though he had intended to defraud, and if he is really honest, he will make the purchase good in some equitable way.

There is also a possibility of the purchaser not knowing whether or not the animal he receives is what it should be. The seller may not have overdrawn description, but he sees the animal in the light of experience and knowledge, whereas the buyer does not really know a good animal when he sees it. I remember an incident of this kind that came under my notice some years ago. A friend ordered a male pig from a reliable breeder. The pig came and the buyer was greatly disappointed. He had in mind a show animal fitted for the fairs, whereas the pig received was in good breeding condition only, and of course, not having

on his dress parade clothes, he did not look as handsome as the same animal would have looked had he been highly fitted. The buyer did not know that the animal sent him was really first class, but having seen some male pigs at the fairs that fall bred and fitted by this breeder he expected to receive a pig in just that condition. He wrote the breeder a very scorching letter, but the breeder was wise enough to ask him to reserve his judgment until after he had used the animal, and if he was not satisfactory then, to return him and he would refund the price paid. The purchaser was greatly pleased with his purchase after he had kept him long enough to know his true value, and afterwards thanked the breeder for sending him this pig. Breeders cannot send out all their animals fitted for state fairs, but they should send them out in good thrifty condition. Sometimes breeders depend upon pedigrees alone, but the buyer is entitled not only to the pedigree that he gets with his animal, but is entitled to an animal well and carefully developed, and in good flesh and perfect health.

I have purchased considerable stock on mail order, and do not think that I ever was deliberately cheated, although I have often been disappointed at the time the animal was received. However, I believe I have always gotten full value where the animal purchased had been properly cared for, and good judgment used in feeding, etc., and was handled properly after reaching me.

I deduct the following conclusions from my own experience in buying and selling pedigreed swine on mail order:

1st. You must pay the price if you expect to get the quality. Don't expect a $40.00 pig for $15.00. It pays to buy the best, and to get the best, you must pay a fair price.

2nd. Buy only from those breeders in whom you have confidence, and do not hesitate to take their judgment to some extent.

3rd. Do not be disappointed if on receipt of the animal it is not exactly what you had pictured, provided there are no material defects, and the seller has not overdrawn his description.

4th. Breeders should be careful in their description, should send out only really first-class animals, properly fitted, but not overfed.

5th. Buyers should state plainly what they want, and not expect a breeder to describe every animal in his herd.

6th. Buyer and seller should not be unduly influenced by "fads" in blood lines, or in certain marked development of the animal. All the good hogs do not belong to any one family, and all good hogs do not have a perfect ear or head, etc., though these points are very important and not to be overlooked.

7th. "Make good" all statements and contracts, no matter what it costs.

DISCUSSION.

Mr. Boles—Mr. Chairman, in order to open the discussion I will just name two or three points that I think it is very necessary for breeders to notice. The first thing when buying stock on mail order is to know the breeder. You should know the man from whom you buy your stock. I would say, never buy anything from a man who is not reliable, and upon whose judgment and honesty you cannot depend. There are men who may be honest in their judgment and they may describe to us the best they have as being their best, but at the same time their best may not be at all what we would like to have.

The next question is to know what you want and to know what you are willing to pay. You can size up your pocket book better than the breeder can and if the breeder is reliable and you want to pay for a hog you can tell him as nearly what you want by telling him what you want to pay as any other way and then he will send you the best pig he can for the money, as a rule.

In my opinion you want to describe that animal in as few words as possible to express your idea. The more you say about it, the more trouble you make, and the more misunderstandings will there be about it. Just describe in a few words. If you want a first class animal, say so, if you want a good one, say that, if you want a finished one, say that. If you want something that will win in any kind of company, say that is what you want and the breeder will know just what you want and if he has it can fill out your order and if he has not, you need not trade with him or can send him to buy stock for you. These three are as good rules to go by as any that I know.

Mr. Ellis—I would like to ask the breeders present a question to bring out their opinions on a phase of this subject—that is, if they believe it good policy to sell animals to their neighbors for less money than when they sell on mail orders? I know that is the practice with a great many breeders and a great many of them have an idea that they cannot get as much money from a man in the neighborhood as they can on a mail order.

Mr. Frost—If I was pricing a pig to my neighbor I would price him at the same price that I would to you or a man who lived outside the State of Missouri. We do not sell many pigs to our neighbors. If our neighbors want a pig they generally go to some other county to buy. I believe we probably have the confidence of our neighbors as much as most people do. The Word tells us that "a prophet is not with-

out honor save in his own country," and it is a good deal better, most people think, to buy something away from home than to buy that article at home. I would make no discrimination in price between a neighbor and a man living elsewhere. If a pig is worth $25 to a man in Tennessee, we would be doing wrong to sell him for less to a man in Randolph county. If he is worth $15 to a man at home, he is worth that much to the man away from home.

Mr. Hall—Mr. Ellis' question brings out something that we know is true. For instance, a few years ago I had a neighbor who wanted to buy a Young Mary calf and he came and looked him over. The calf was a very fine yearling and my neighbor wanted to know if $50 would buy him. I said no. In a few days I got a letter from a gentleman down in Southeast Missouri. That letter contained a hundred dollar money order. The instructions in the letter were: "Send me the best calf you can for the money." I sent him this calf that my neighbor had tried to buy for $50, and of all the good things that have ever been said about me, that man who bought that calf said the best. He said: "I would rather have that calf than any I could have picked out myself." It is a fact that our neighbors do not think that we can find a market for our bulls or pigs somewhere else, hence they try to beat us down on the price and if we had the nerve to do it, we ought to let those that we cannot sell at a reasonable figure go to the market or to the butcher. If the stuff is worth the money we ought to demand it and not sell it till we can get it.

Another point I want to notice. If we are beginners we had better depend on the man who sells to us that on ourselves; or better, have some good friend who has had experience in our community, do our buying for us. If we must buy on mail order, why, we simply must; but we had better not do it. We had better go and see the stuff we buy. A few years ago I wanted a hog and wrote to a man in Ohio. I told him to send me a good hog. When he came I was disappointed, but I kept him three or four years and I believe he was the best hog in the neighborhood; yet when he came I did not like him. So we cannot always judge what a pig is going to be by what he looks like. But as a rule we had not better buy on mail order.

Mr. Boles—There is another point on selling cheaper to a neighbor than anyone else. Sometimes it is a relief to have a home buyer buy something that we would not send away. I do not price anything under a certain standard in the sheep line to send away and those under the standard I sell to my neighbors—that is if they come and see them. If you come and see my stock and you want to buy it at my price, that is

all right, but if you depend on me, I will not send you any scrubs. I do not price a ram under a certain standard when it is left to me, but when a fellow comes and sees it, if he wants to buy it at my price, he can buy it at home or abroad.

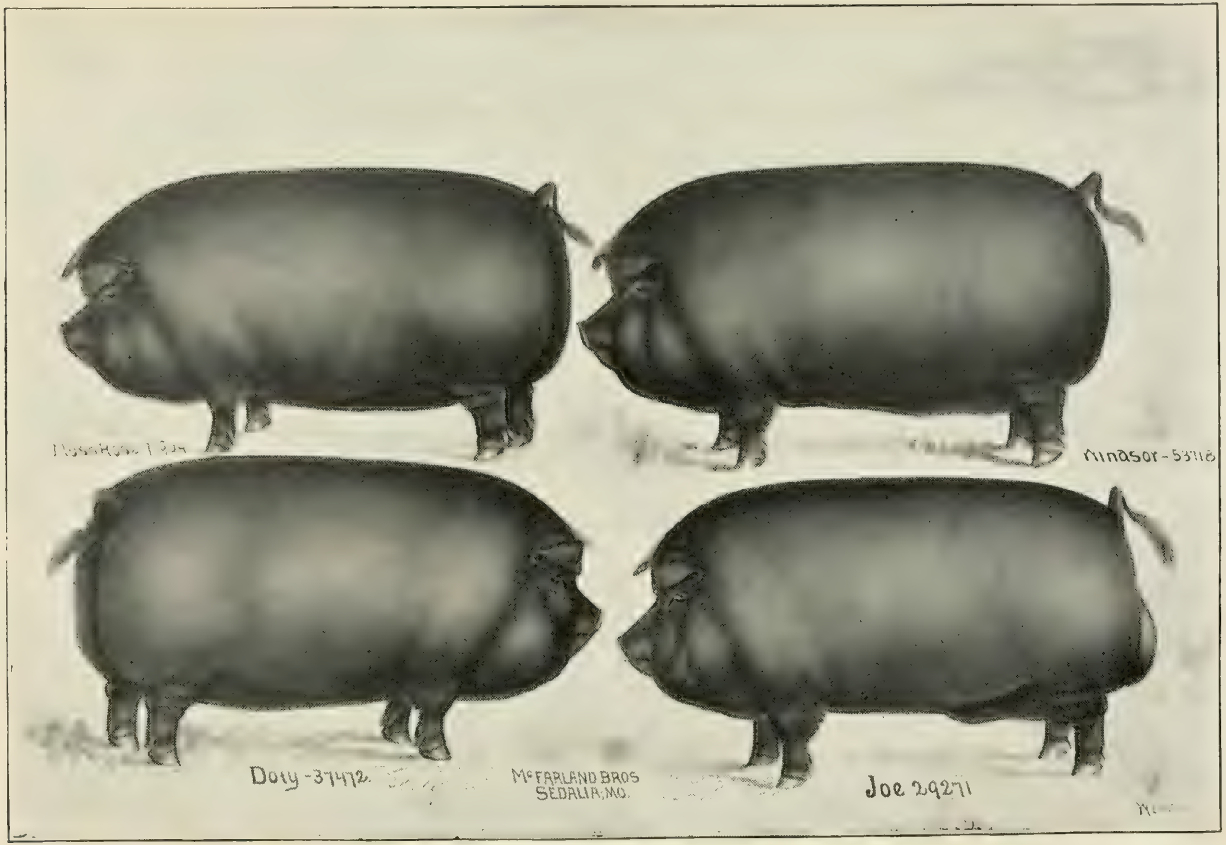
Mr. Kurtz—This subject of selling at home or abroad is a very interesting subject to me, and to be frank and honest in the matter, I feel that my neighbors have a right to expect some little concessions in my case. I feel that when I am making concessions to my neighbors whom I know and who desire to engage in elevating the quality of their cattle or hogs but who are limited in means and have had no experience in this line of elevating the standard of their animals by breeding to pure bred males, I am not only helping them but I am helping myself. I am not only helping myself, I am not only helping the neighborhood and helping the cause of elevation to a higher standard of animals, but I feel that I am elevating and helping the standard and the commercial influence in the way of selling pure bred animals by encouraging that class of people to buy those animals to start with.

Mr. Mumford—The majority of this audience are young men who perhaps have had no experience yet in the live stock business and there are two or three of the speakers who have touched upon a subject that is of fundamental importance in the buying of pure bred live stock. I suppose our live stock record associations are as well managed as it is possible for such associations to be managed, and it is probably true that the animals registered in our live stock record books ought to be registered in the great majority of cases, but I need not say to the experienced breeders here, but there is a great opportunity for the registration of animals that are not entitled to registration and that no young man or old man either can afford to buy from any breeder of pure bred live stock who is not thoroughly reliable, for two or three reasons. If a man is thoroughbred, his stock is certainly thoroughbred.

Another thing, every reliable breeder who lives up to his contract stands ready at all times to make good what he promises to do and it is a very important thing in the buying of live stock, as these gentlemen will say.

I know of a man who imported two very valuable Shropshire rams from England. One of them unfortunately died on the way over and was consigned to the ocean, but in some way or other by the time he landed on his farm he had two imported Shropshire rams that he sold as imported rams at a very high price.

I heard of another case. I know a young man who has a very large trade in registered Shropshire rams—the western trade—and who, so



Four Duroc-Jersey prize winners at World's Fair, St. Louis, 1904. The Boar shown in the cut won the Grand Champion Prize for Durocs, any age. These hogs are owned and were bred by McFarland Bros., Sedalia, Missouri.

far as I know, had never sold anything but a registered Shropshire ram, who has bought a lot of lambs that never were and never could be registered, and what he did with them I cannot tell.

It is of fundamental importance in buying pure bred live stock more than any other class of animals that you buy from responsible breeders and then you are safe. This is advice essentially for these young men here.

Mr. Ellis—I called up this question because I thought it was important. I want to say I believe the breeders themselves are responsible for a bad business practice. I do not believe in much sentiment in business. When I trade with a man in any line of business and find he has one price for me and another for somebody else, I quit dealing with him. I believe this is the gist of the whole thing. You want to put a value on an animal. If the animal does not come up to a certain standard, it is not good policy to price that animal at all, on mail order, but if a man from a distance comes to see you, put the same price on him that you do for a neighbor. You may feel that an animal ought not to be sold without personal inspection, but if you price him at $50 at home, while you price him to a man in an adjoining state at $75, the latter is an extortionate charge and that is poor business policy and breeders are responsible for such a condition.

Mr. Gabbert—I never sold an animal in my life on a mail order and I would not under any consideration. The purchaser has got to see the animal and when he writes to me in regard to my cattle, I will price them to him and I say you must see these cattle. If you are a young breeder you will see my methods of handling my cattle and you will see the herd and the sire and tell what a calf will grow to be.

Mr. Emmons—This idea of Mr. Kurtz's is a new one to me. I never heard of it before, but there is some reason in it. If we have ten pigs to sell or ten calves to sell and our neighbor comes along and says, "I will give you so much apiece for them," the question is with me how much must I get for these ten pigs and you say I want $25 apiece for them. The neighbor says, "I will take them." Suppose your neighbor refuses and you have to spend $100 to advertise, make crates, etc., and by the time you get through you have not realized as much for them by sending them away as you would have done by selling them at a little less price to your neighbor. That is the only thing I see in it. A man has to advertise and spend money to get these orders from abroad. It is the weakness of the human race, and you cannot deny it, to look afar off for something good and they want something for nothing. I want to say to these young men, if you want something good, pay the price

for it. If you want a good education, come here and pay the price. As Mr. Frost says: "If a man wants something good, he sends to a reliable house and pays the price."

SOME RATIONS FOR FEEDING HOGS.

(Prof. E. B. Forbes, Agricultural College.)

I have chosen to speak to you on the economical use of grain for fattening hogs—a plain talk on a plain subject, which comes pretty close to the business of every farmer. Our object in feeding hogs is to make the most pork possible from a bushel of corn with the least expenditure for supplementary feeds. I say supplementary feeds—that is, feeds to be used with corn—on account of the fact that corn itself is not a perfect hog feed.

I shall not dwell upon the deficiencies of corn as a hog feed—that is corn alone—but will merely enumerate them because that is a story in itself. The deficiencies are as follows: There is not as much protein in corn as a fattening hog needs. Compared with the protein there is an excess of starch. A hog uses these nutriments in certain definite proportions, in a measure irrespective of the amounts in which they were present. If you feed him too much starch in proportion to the protein, he wastes the starch. We know that we can improve the ration of corn alone. The question is, can we afford to improve it? Another deficiency is that corn lacks mineral matter—ash—bone food. The third is that a hog, fed on corn alone is confined to a monotonous fare, and although it seems absurd to speak of corn as lacking palatability, still, we can combine a mixed ration of which a hog will eat much more than of corn alone.

I believe that the cheapest pork is usually made on pasture because green crops are our cheapest feeds. A well compounded grain ration, however, will make pork in a dry lot in the winter time very nearly, if not quite as cheaply.

There are two common methods of treatment of hogs on pasture. One is to push the pig from birth until he has reached the market weight, to make as much pork every day as it is possible for the pig to make. The other method is to grow the pig slowly during the summer time, making as much pork out of the green feed as possible and to finish on a short period of full feeding at a later date. These two methods each have their points of superiority. The question is one that cannot be definitely decided for all; it must be decided for each one according to

circumstances. The questions involved are these, will you make pork quickly with a minimum of risk—for time is risk in pork production—or will you make your pork more slowly, and more cheaply with a little greater risk? You can make more pork from a bushel of corn fed on pasture if you make it somewhat slowly than if you full-feed.

In most of our feeding work, we are obliged to base our conclusions upon slight evidence, simply because we have not carried our experimental work far enough so that we can depend on our results, but we have to do the best we can with what we have, announce our temporary conclusions, and wait for time to improve them by repetition.

TABLE I.

UTAH STATION FIVE YEARS' EXPERIMENTS.

Rations.	Daily Gain.	Grain per cwt. Gain.
Grain, pasture	1.21	374
Grain, ¾ pasture	1.01	354
Grain, ½ pasture	.75	302
Grain, ¼ pasture	.55	274

This table is the result of five years' experimentation on one subject and I believe that it is thoroughly reliable. It is rarely that we find in pig feeding five years' work devoted to a single subject and their results are as follows:

The pigs were fed on pasture. The first lot was given all the grain they would eat. The second lot was fed three-fourths of that amount of grain, the third a half and the fourth a quarter as much. The average daily gain per head was naturally according to the amount of grain fed. The grain requirement per hundred weight of gain, however, was in inverse relation to the amount of grain fed. The less the grain fed, the cheaper was the pork, figuring on grain alone. Now you can just take your choice, make that pork fast or make it more slowly and more cheaply. Every man has to settle that question according to his own condition. That is all I see in that question. I do not believe it can be settled definitely for every one, it has to be settled for each one according to his necessities and the conditions under which he labors. To make the cheapest pork, you should feed a partial grain ration on pasture. To turn your money over most quickly and with the least risk, full feed on pasture.

TABLE II.

MISSOURI STATION.—90 DAYS SOILING EXPERIMENT.

Rations.	Daily Gain....	Grain per cwt. Gain........	Cost of Grain per 100 lbs. of Gain....
Corn meal and blue grass.....	.71	520	$3 31
Corn meal, rape.......	.78	482	3 07
Corn meal, clover...	.87	429	2 73
Corn meal, alfalfa....	.95	397	2 52
Corn meal, milk....	1.81	214	1 55

Average weight, 48 lbs.

As to what kind of pasture we shall use, we have very few data on that question. Here at the Missouri Station an experiment was carried out year before last with green feeds cut and fed with corn to pigs in small pens. That is not equivalent to pasturing the pigs on these feeds but it affords us an accurate comparison of the actual value of the feeds as they grow, though probably not just as the pig selects them while he grazes. The substance of the matter is that with corn worth thirty cents a bushel it costs $3.31 a hundred pounds to make pork with blue grass, $3.07 to make pork with rape, $2.73 to make pork with red clover, $2.52 to make pork with green alfalfa and $1.55 to make pork with milk; so it takes less grain to make one hundred pounds of pork with skim milk than with any of the green feeds tested.

TABLE III.

NEBRASKA STATION.

Ration.	Daily Gain.	Grain per cwt.	Cost 100 lbs, Gain.
Corn meal, alfalfa pasture......	1.22	400	$2 51
Corn meal, alfalfa leaves 4:1..	1.20	467	3 44
Corn meal....	.93	747	4 75
KANSAS STATION.			
Corn meal, alfalfa hay 4.56:1....	1.18	465	3 36
Corn meal....	1.20	529	3 36

We hear a good deal about feeding hogs on alfalfa pasture and hay. The Kansas and Nebraska stations have studied this matter pretty thoroughly. What is there in it? At Nebraska they feed hogs on alfalfa pasture with almost exactly the same result as in our soiling experiments.

It cost $2.54 per hundred pounds to make the pork. At the same time they fed corn meal with alfalfa chaff, that is, the leaves broken off from the hay as it was thrown from the mow. These leaves are just about as rich as wheat bran. They fed corn meal and alfalfa in the proportion of four parts meal to one of alfalfa leaves. Figuring alfalfa at $8 a ton, it cost them $3.44 a hundred weight to make the pork. I have assessed a valuation to the hay, because hay has a definite cash value, but it is arbitrary to assess any cash valuation to the green feeds in table II, because it is impossible to do this in a way that fits all conditions. At the same time another lot fed on corn meal alone made a gain of .93 pounds a day. It took 847 pounds of corn meal to make a hundred weight of pork and it cost $4.75 a hundred pounds to do it. These results would make it seem profitable to feed alfalfa hay with corn. The pigs so fed certainly did better than those fed on corn alone, but we can do so much better that I would not stop there. I would not feed alfalfa leaves to anything except brood sows. Some less bulky feeds return more profit.

At the Kansas Station they fed corn meal and alfalfa hay, allowing the hogs to eat what they wanted. They did not eat as much of the hay as of the leaves at the Nebraska Experiment Station. They made about the same gain at about the same cost in grain, per cwt., $3.36. The corn meal lot, fed in comparison with this corn meal and alfalfa hay produced about the same gain, but it required much more grain, at the same cost, however, on account of the fact that grain alone was used in this case. There was no financial gain and no gain in the rate of making pork with alfalfa hay at $8 per ton and corn at 30 cents a bushel. It would have been better to sell a part of that corn and buy something less bulky than alfalfa hay to feed to the hogs.

TABLE IV

INDIANA STATION.

Rations.	Daily Gain.	Grain per cwt., Gain	Cost per 100 lbs.
Corn meal 10, tankage 1	1.17	370	$2 59
Corn meal 5, tankage 1	1.24	378	2 95
IOWA STATION.			
Corn meal 5, tankage 1	2.57	381	2 97
Corn meal	2.08	461	2 93

The Iowa and Indiana Stations have done some work on the subject of feeding tankage to hogs. Tankage is a good feed for hogs—a splendid feed, but the one question is, can we afford to feed it? Let us see what the Experiment Stations say on the subject. The Indiana

Station fed two lots on tankage, one received ten parts of corn meal to one of tankage, the other five parts of corn meal to one of tankage, the object being to see how much tankage they should feed for the greatest profit. This tankage, by the way, is a refuse product from the packing house. The meat scraps that cannot be used in sausage or handled otherwise for human consumption, are thrown into the rendering vat. Here it is steamed under about 40 pounds of pressure until all of the fat has come to the top as oil; after the removal of the oil the remainder, which consists of the lean meat and bone scraps, is dried, ground, sacked and sold for hog feed. At the time that these experiments were conducted it cost $30 per ton. The better grade only should be used, as the higher grade is a cheaper feed than the lower one. If it can be had at $30 a ton, it is a cheap feed. The daily gains in these two lots were 1.17 and 1.24 respectively; the grain per hundred weight of pork very nearly the same. The cost was greater where the larger proportion of tankage was fed. They made pork more cheaply by feeding ten parts corn meal to one of tankage than five parts corn meal to one of tankage.

The Iowa Station fed another lot of hogs on this five to one ration and it was the less profitable of the two. The hogs made a tremendous gain, 2.57 pounds a day. The grain per hundred weight gain was very low, 381 pounds, and considering the fact that these hogs had been grown to a weight of 200 pounds before the experiment began, that is a very low requirement. The cost of 100 pounds of gain was $2.97. But they made such a splendid showing for corn meal alone that they got no added profit from the use of the tankage. If these had been younger hogs, the corn meal would not have done nearly so well in proportion. They could not have grown on corn meal alone nearly as well as on corn and tankage.

TABLE V.

MISSOURI STATION.

Ration.	Daily Gain.	Grain per cwt. Gain.	Cost per 100 lbs. Gain.	Value corn per bush.	Value of Supplement per ton.
1. Corn meal 5, oil meal 1	1.48	376.6	$2 75	$ .496	$49 01
2. Corn meal 20, oil meal 1	1.16	430.3	2 85	.448	90 42
3. Corn meal 2, middlings 1	1.24	427.8	2 88	.483	24 10
4. Corn meal 4, middlings 1	1.08	460.4	3 03	.432	25 85
5. Corn meal 2, ground oats 1	.58	642.7	4 28	.258	7 54
6. Corn meal 4, ground oats 1	.65	621.5	4 06	.296	5 96
7. Corn 4, bran 1	.91	492.1	3 14	.412	20 92
8. Corn and cob meal	.32	945.	4 81	.21	
9. Corn meal	.755	555.6	3 53	.356 .374	
10. Soaked corn	.63	577.7	3 10	.36	
11. Corn, bone meal	.45	655.6	3 55	.317	
12. Shelled corn	.405	693.2	3 71	.30	

In this group of a number of supplemented rations and rations of corn alone prepared in various ways, we have a comparison of quite a number of feeds on the same basis, and it gives us a good chance to measure one with another. The conditions here were just the same. We sorted these hogs very carefully so that the gains would represent the comparative value of the feed. They were common hogs, not well-bred ones. They weighed 118 pounds each when they went on feed. They were fed for ninety days in small pens with no green feed and no earth to root in. This was strictly dry-lot feeding. Corn meal, five parts to one of oil meal made the best gains. Twenty parts of corn meal to one of oil meal made a somewhat smaller gain at a somewhat greater expense in grain and a slightly greater expense in dollars when we fed corn at 30 cents a bushel and oil meal at $24 a ton. One ton of oil meal in ration No. 1, which is the five to one ration, saved $49 worth of corn. I get at that figure by comparison with lot 9 where corn meal alone was fed. In that lot we made slightly more than ten pounds of pork per bushel, about what the average farmer makes, so there is nothing wrong about using that. You will all admit that ten pounds to the bushel from corn alone is about what you can figure on. The $24 worth of oil meal saved us $49.01 worth of corn. In the second lot, it saved $90.42 worth of corn. The oil meal in the smaller proportion saved more corn per pound of its own weight than in the larger proportion. It has a slight medicinal value and when used in small amount its value as a condiment exceeds its value as a food. The cheaper pork was made where the larger amount of oil meal was fed. In the first lot, the corn, figured at 30 cents a bushel, was worth 49.6 cents. In lot 2, it was worth 44.8 cents.

Lots 3 and 4 were fed on corn meal and middlings. The smaller proportion of middlings had a greater value per pound than the larger proportion. The smaller amount adds more palatability per pound of its weight than the larger one, and palatability counts. In a general way, it means digestibility.

To lots 5 and 6 we fed oats with the corn. Comparatively speaking, there was no profit in it. I figured oats at 20 cents a bushel corresponding to 30 cents per bushel for corn. It took an enormous amount of grain per hundred weight gain, and the cost of pork, while it was only $2.75 with the corn and oil meal, was $4.28 and $4.06 with the two rations of corn and ground oats. It looks as though the fewer such oats as this one has in the ration, the better the ration is for fattening hogs. Oats are too bulky; hogs do not like them. A better grade of oats with a smaller amount of hull, would be more valuable for fattening hogs. If the hulls are removed oats are valuable

for hogs. A cheap grade of oatmeal that costs $28 per ton is worth while for show hogs, but not for fattening hogs.

In lot 7 we fed wheat bran in the small proportion of one part to four parts of corn. It was not so good as the middlings ration of four parts of corn meal to one of middlings, but it was better than the corn alone fed to lot 9. It took 555.6 pounds of grain to make a hundred pounds of pork with the corn meal alone, compared with 492.1 with the corn and bran ration. So this small amount of bran has a value; it took 460.4 pounds with the corn and middlings (lot 4). Middlings are of somewhat greater value than bran.

The corn and cob meal we had to grind three times to get it fine enough to feed to a hog and then it was not so fine as I would like to have it. I assumed that if I had had the right kind of mill I could have ground it at the same expense as corn, and that was giving an unpromising feed a very fine show. You see how it came out. The corn was worth 21 cents a bushel ground in this way when it had cost us 30 cents a bushel whole. I would not use that feed for any purpose.

These were all ground feeds. We assume that corn costs us 30 cents a bushel, and that it costs us ten cents a hundred weight to grind it.

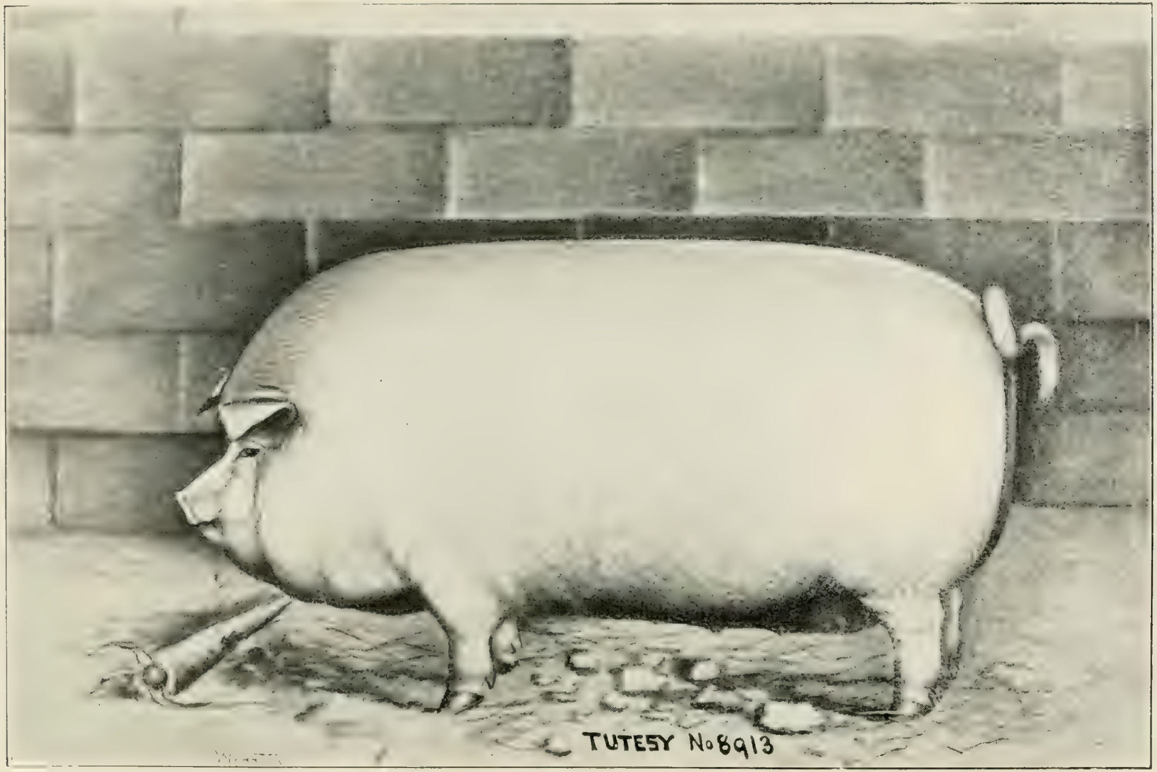
The smallest gain was made on the shelled corn. If shelled corn is 30 cents a bushel, the corn meal (lot 9) was worth 37.4 cents. It costs 5.6 cents at the mill to get it ground. With our gasoline engine at the farm, it cost us three cents a bushel for grinding. Grinding then, for dry lot feeding, according to these results is profitable.

Soaking costs next to nothing. In this experiment it was worth six cents a bushel; where grinding is worth 7.4 cents, soaking is worth 6 cents.

In lot 11 we fed bone meal with the corn and in ninety days each hog ate 6.2 pounds of the ground bone. That made the corn worth 31.7 cents per bushel. It is of some interest as it shows that the lack of bone food in corn is a real deficiency. Add the bone meal, which contains nothing but mineral matter and you increase the value of the corn. We do not need bone meal with anything but corn alone. A ration of mixed grains or roughage or milk or anything of that sort needs nothing of that kind. It is only needed when the hog is confined to a diet of corn alone.

SUMMARY.

We probably make the cheapest pork with corn and skim milk; next, I should say, comes corn and alfalfa pasture, then corn and clover pasture.



Tutsey, 8913, bred and owned by Judge L. L. Frost, Mirabile, Missouri. Tutsey is out of a litter of 14 pigs farrowed September 13, 1902, won championship prize in her class at American Royal in 1903, and although nourishing a litter of ten pigs during summer of 1904, won 7th place in her class at the World's Fair.

In dry-lot feeding we make the most pork at the least expense at usual prices of feeds in Missouri, from corn fed with oil meal or tankage or wheat middlings.

DISCUSSION.

Mr. Laughlin.—Is the cost per 100 pounds in Table II the cost of the grain and pasture, or simply the cost of the grain?

Mr. Forbes.—Only the cost of the grain, the others are feeds to which we can not assign cash values. It is not a complete statement of the question, but if you try to assess a valuation to the green feeds, it is so arbitrary that it does not mean anything at all.

Col. Waters.—What was the price of the milk?

Mr. Forbes.—I have figured only on the price of the grain fed, and not on the milk. If you assume milk to be worth 18 cents a hundred weight, corn and milk would make the cheapest pork. This milk was fed in the proportion of three pounds of milk to one of grain. So far as the grain requirement is concerned, corn and milk will make much cheaper pork than corn and any kind of pasture. While we kept them on grass the daily gain was .71 pounds, on alfalfa it was .95, but on corn meal and milk it was 1.81.

These pigs averaged 48 pounds in weight when put on this feed. They were fed 90 days.

What I get out of that table is, if you can get skim milk, it is probably your cheapest feed to use with corn, and if you can get that, you don't need anything else.

Mr. King.—How can you reach that conclusion unless you know what blue-grass and clover and alfalfa cost?

Mr. Gabbert.—Alfalfa has as much market value as corn. I have been buying some.

Mr. Mumford.—How much a ton green alfalfa is worth depends upon how much water there is in it.

Mr. Forbes.—These figures have been computed on the basis of $3 a ton for all of these green feeds. That was so arbitrary that I left it out, but it leaves these figures in the same order.

Mr. Laughlin.—What was the price of the milk?

Mr. Forbes.—Eighteen cents a hundred pounds.

Mr. Frost.—What are your conclusions about tankage?

Mr. Forbes.—With 30-cent corn and tankage, we ought to make pork for $3 a hundred weight. Some do not do so well as that, and some better. Suppose we figure $3 a hundred weight, with 30-cent corn as our standard. That is beyond what the average feeder does.

I consider tankage valuable, and if you can get a high grade for $30 a ton it will be a profitable feed to use.

But tankage does not always mean the same thing. There are some packers, however, who make a uniform feed. I am not advertising any company, but the Swift tankage is a comparatively uniform product, and appears to be a superior preparation for hog feeding. If you can get it for $30 a ton, it is worth the price.

Mr. ———. When corn is worth 50 cents a bushel, what is your conclusion in regard to tankage?

Mr. Forbes.—The figures in Table IV were on corn at 30 cents a bushel and tankage at $30 a ton. If you can buy tankage at $30 a ton, when corn sells for 50 cents per bushel, the tankage will be much better worth the price than in this experiment. While we are figuring on pork at $3 a hundred weight, with corn at 30 cents, do not assume on that account that our standard would be $4 a hundred weight with corn at 40 cents a bushel. We ought to do better than that. If you make pork at $3 a hundred weight from 30-cent corn, it is easier to make it at $4 from 40-cent corn, and still easier to make it at $5 a hundred weight from 50-cent corn, because the feeds you use with corn do not increase in cost as the corn does in selling price. For instance, in Table V the wheat middlings will not double in value when corn does; they usually rise from $15 per ton to $20 per ton as the corn doubles in value as between 30 and 60 cents per bushel. The same is true with oil meal and all the feeds that you use with corn. They do not rise in price as rapidly as does corn.

Mr. King.—Table I has made a very great impression on me as to the importance of feeding young stock and getting rid of it quickly. You tell us that there are two ways of making pork there, and that the slow way is the cheapest. Is that true of young stock?

Mr. Forbes.—The increase in the expense of making pork as the hogs increase in age is not great until you get the hog fat. The great increase in the expense comes between 200 and 250 pounds. There is not a vast amount of difference in the cost of making increase at lower weights.

Mr. King.—You have to have him a fat 200-pound hog in order to make any difference?

Mr. Forbes.—A thin 200-pound hog will put on flesh with less expense than a fat one.

Mr. King.—If when buying hogs I can buy 200-pound thin ones I can afford to pay more for them than the 200-pound fat ones, how about the fellow who sold them? Was it more expensive to raise the

thin 200-pound hog or the fat one? I am raising hogs, and I want to know which way I can make the most.

Mr. Forbes.—The fat 200-pound hog costs more in the raising, but you do it more quickly and with less risk.

Mr. Boies.—You cannot buy 200-pound thin hogs, unless by rare chance, now-a-days.

Mr. King.—No, but I can raise them.

Mr. Forbes.—If you want to turn your money quickly, feed fast. If time is no object to you, feed more slowly, so as to get as much good as possible out of the pasture.

Mr. King.—I have more blue-grass pasture than hogs to turn on it. What had I better do?

Mr. Forbes.—Feed your hogs on the pasture.

Mr. King.—How about clover pasture?

Mr. Forbes.—It is a better feed.

Mr. Raine.—Are you now feeding hogs from pigs, or from 200 pounds to shipping time, in what you have been giving us?

Mr. Forbes.—Practically all of these were young pigs, being grown and fattened at the same time.

Mr. Raine.—We have passed the age when we grow hogs to 200 pounds before we begin to fatten them.

Mr. Frost.—Is not oil meal a dangerous feed for hogs?

Mr. Forbes.—No; it is the one feed besides corn that I call a wonderful feed for hogs.

Mr. Gabbert.—Oil meal is too high; it is worth $27 per ton.

Mr. Forbes.—Yes, but look at corn! and at middlings! Middlings cost $20 a ton now, and oil meal at $27 a ton is much the cheaper feed. It was slightly cheaper when we made the figures in Table V, but it is much cheaper now.

Mr. Gabbert.—There are so many of these stock feeds on the market, is not oil meal the basis of all of them? Does not the value that is being attached to them belong to the oil meal?

Mr. Forbes.—Yes, the oil meal at $24 a ton is ever so much cheaper than some of these at $150 a ton. It is a fact, and an interesting one, too, that it may possibly be worth the price that it costs in stock foods, if fed in small quantities. If you feed oil meal in very small quantities you will get enormous returns from each ton fed. There are people who believe in feeding patent stock foods, and if their belief is based on any evidence it is probably based on some such evidence as this.

Mr. Gabbert.—They use in most of these feeds 50 per cent salt, and I think that is a good ration.

Mr. Emmons.—How would it do to use cotton-seed meal instead of oil meal?

Mr. Forbes.—I am experimenting with cotton-seed meal now.

Mr. Emmons.—Don't you think hogs will do well on a small per cent of cotton-seed meal?

Mr. Forbes.—I am trying to find out. So far as we know it is a poison to hogs. It is not good for calves. As a rule, I think it is the cheapest grain supplement to corn for older cattle.

I am carrying out an experiment in feeding it to hogs, fermented. I expect these hogs to die as other people's do, but they may not. Remember that ration No. 1 (Table V) is a balanced ration, and I fed that to growing pigs for dry-lot feeding.

Mr. Boles.—What is the best feed when they have the run of clover pasture?

Mr. Forbes.—Then I would feed them corn, but in dry-lot feeding I would give them ration No. 1. They do not like oil meal at first, but in a day or two they come to like it. Probably it will be more palatable by mixing some middlings with it.

Mr. Boles.—Do you make the slop thin?

Mr. Forbes.—This was fed in a thick slop.

Mr. ———. Would not charcoal do as well as the bone meal used with lot 11, Table V?

Mr. Forbes.—Probably not. It has a different composition and usefulness. Lime has a very slight value.

Mr. Gabbert.—Hogs like lime, for some cause.

Mr. Forbes.—There is more phosphoric acid in bone meal than in lime, and that is quite useful to hogs.

Mr. Emmons.—What do you think of germ oil meal?

Mr. Forbes.—I am testing germ oil meal, gluten meal, gluten feed and cotton-seed meal, oil meal and middlings on the farm now and will tell you the results next year.

Mr. ———. Is feeding cob corn charcoal a detriment?

Mr. Forbes.—I do not think it is. The cob contains some ash, a slight amount of potash and a very slight amount of phosphoric acid.

Mr. Boles.—How do you think it would do to put concentrated lye in the slop?

Mr. Forbes.—It would probably clean your barrel.

Mr. Boles.—And the hogs?

Mr. Forbes.—Maybe it would.

THE BEST TYPE OF COW FOR THE MIDDLE WEST.

(W. P. Harned, Vermont, Mo.)

Ever since the days of Jacob and Rachael and the striped sticks in the watering trough, the cow question in some phase or other has been under consideration.

From that early day down to the present the calf trade, the cow trade and the beef trade have flourished and grown. Our subject does not deal with the right or the wrongs of manipulating the trade in the finished product, but rather with the particular type of animal or class of machine that converts the feed from the farm into this finished product. It is entirely proper to consider the domestic cow in the light of an economical machine moulded by man to manufacture milk, butter and beef from corn, grass and hay—the raw material—not forgetting that the cow is an animate machine susceptible to kind treatment, good care, and we believe, even affection. After all, however, the whole problem is summed up in the text, "The Highest Class of Article With the Least Cost of Production." Hence economy is the purpose and improvement is the method.

With the changed conditions that have come about of higher land and higher labor and a denser population, I assume that the best type of cow for the middle states is the dual purpose cow; the real dual purpose in her improved form; a high class carcass of beef with a good supply of milk. She is the poor man's cow and she is the cow for the average farmer. As land grows higher she becomes more and more a necessity and all the more valuable. It is still argued by some that such a type is not practical, and that the production of one is antagonistic to the development of the other. Be that as it may, this type has been produced very successfully and is still among us, though not in as large numbers as the special purpose type.

I cannot concede that the development of the real dual purpose cow is impractical and inconsistent, as we have living examples of animals that are high class at either purpose. One that has been illustrated extensively of late in the live stock journals is Mr. Duthie's White Heather, a cow that has won many first prizes at the leading beef shows in England, while also beating all competitors at the great dairy tests. It will not do to estimate her a sport or freak, as she was bred for that purpose from ancestors of that stamp.

Neither do I believe, as claimed, that the development of the

high class beef making quality is antagonistic to the cultivation of the real dairy quality. I do not consider the combination inconsistent with scientific breeding. In fact, it seems true at least in the Shorthorn breed of cattle that the two qualities go hand in hand and the one is interlinked with the other, for the best beef producing dams are the best milkers. There was a splendid illustraton of this point at the great International this year. Indeed, I once heard a noted Hereford breeder say that even his very best breeding cow gave a large supply of milk. The two greatest Shorthorn breeders in Scotland are strong advocates of the dual purpose in their cows, and it is known the non-milkers are weeded out.

While I believe the combination cow is the best cow for the greatest number of farmers, it must not be claimed that any one type is best for all conditions under all circumstances in all localities. Wide as may be her sphere of usefulness localities and conditions may exist and do exist where the special purpose type is best adapted. For such a condition the roaming herds of the western plains might be cited, where calves are raised by the thousand and where the best attention that the cow receives is her own natural instinct. Beef is the prime object and the dairy quality is not considered and may even be objectionable as the cow cannot receive that attention necessary to a very heavy milker at calving, when the young born consumes but little. Under these conditions the special beef type is found and this is why the special beef breeds have grown popular on the range.

As these immense herds grow less, and as the great pastures are cut up in smaller farms, where cultivation and cattle raising are combined, then the dual purpose cow finds a home. The real cow for the average farm or small farm should produce a high class beef animal which when weaned off can supply a good quality of milk and butter for use. Such is the ideal cow for the middle states and further east. Let her be good size, say 1400 to 1600 pounds, a gentle, quiet disposition, a strong constitution, a good grazer, apt to fatten when dry and you have the ideal animal, a friend to the farmer.

DISCUSSION—RAG WEED HAY.

Mr. Gabbert—I know if I was going to a doctor for some disease I would go to a specialist for that disease. I would not go to some practitioner who professed to cure every ill. I believe if I was going to raise cattle I would want a distinct breed. I think it would take a good deal to make a good beef animal and a good milch cow at the

same time. You may find the desirable animal, but I think she would be limited in both points.

I want Mr. Harned to make us another little speech. I want him to tell us about the "Missouri alfalfa." For 24 years I have made a persistent effort to get the "Missouri alfalfa" (rag weed) off my farm and I have about succeeded, but all that time I did not know I was trying to destroy one of the best plants I had. I call on Mr. Harned to tell us about "Missouri alfalfa," or rag weed.

Mr. Harned—Now I may be able to offer my excuses by telling of other accidents that have happened. Many of you old, grey-headed men like our chairman, remember when the bran that was taken from the mills used to be dumped out into the river, and they even hired men to haul it away from the mills as manure, but now it is considered one of the best feeds. It is the same with cotton seed meal. We know the cotton seed used to be thrown away in the South and men were hired to take it away from the gins.

Now, I do not know whether my rag weed problem will turn out like that or not.

I will tell you my experience about rag weed. I had cut forty acres of timothy hay one year. I generally stack the hay over the field where it is handiest. But that year I hauled the hay into a hay yard and stacked the stacks together. I was fixing to show a herd of cattle and I wanted some bedding. I had 25 acres of the fairest rag weed and happened to have the time and I had the boys cut the rag weed down and stack it for bedding. I happened to hit the right time before the stalks had gotten woody and we stacked the rag weed by the side of the timothy hay, and in the winter when I went to feed my hay, I turned my cows to the stacks instead of hauling the hay to them, and to my surprise there was not a bit of that hay ever touched until all the rag weed was gone.

Col. Waters—Had it bloomed out before you cut it? Rag weed is very dusty when it gets in bloom.

Mr. Harned—If the dust is a bloom, it should be cut before the dust comes. As good as I think it is, I think if you cut it at the wrong time, you have nothing.

Mr. Mumford—Have you ever repeated that experiment?

Mr. Harned—It turns out right every time if you cut it at the right time. I do not believe it will disappoint anybody, not even a cow. That happened in my younger days and I had not had much experience with five hundred dollar cows when I cut that rag weed hay. I had not had much then and have not had as much since as I

would like to. I think it was in the spring, February or March after I had wintered my herd on rag weed hay that I had my first $500 cow. The first season I stacked my rag weed with the hay, but I cut it another time, stacked it and hauled it out and put it in a rick and a man from Peoria, Illinois, who visited my farm was very much amazed and rather doubtful when I told him what it was. He walked up to the stack and said: "Is this alfalfa?"—it was when alfalfa had begun to be talked of—I told him it was rag weed hay. It is the prettiest hay you ever saw when you put it up right. The man came away stunned from seeing my cattle eating it. He says: "What kind of Shorthorns have you got that eat old weeds?"

Mr. Henderson—I cut a very weedy piece of new meadow last summer. It was more than half rag weed. I cured it and cast it abroad to horses and I noticed to my surprise that my horses and colts would deliberately take out the rag weed and eat it up clean before they ate the hay. It was allowed to cure thoroughly before it was scattered, and I do believe that it is a good feed.

Mr. ———— I have been raising corn and feeding stock all my life and my first business was to try to get rid of rag weed. I made it a rule to send my hands over the field and chop out all the rag weed. I bought sheep to clean my pasture and kept my sheep mixed with the cattle. Now my sheep did not do as well after the rag weed was gone. I put my sheep on meadows which had rag weed in them and I value a meadow with rag weed on it more than red top. I would give $2 more a ton for rag weed hay than for red top. It is no trouble to keep rag weed in the pasture, but I advise you to keep it out of the corn field.

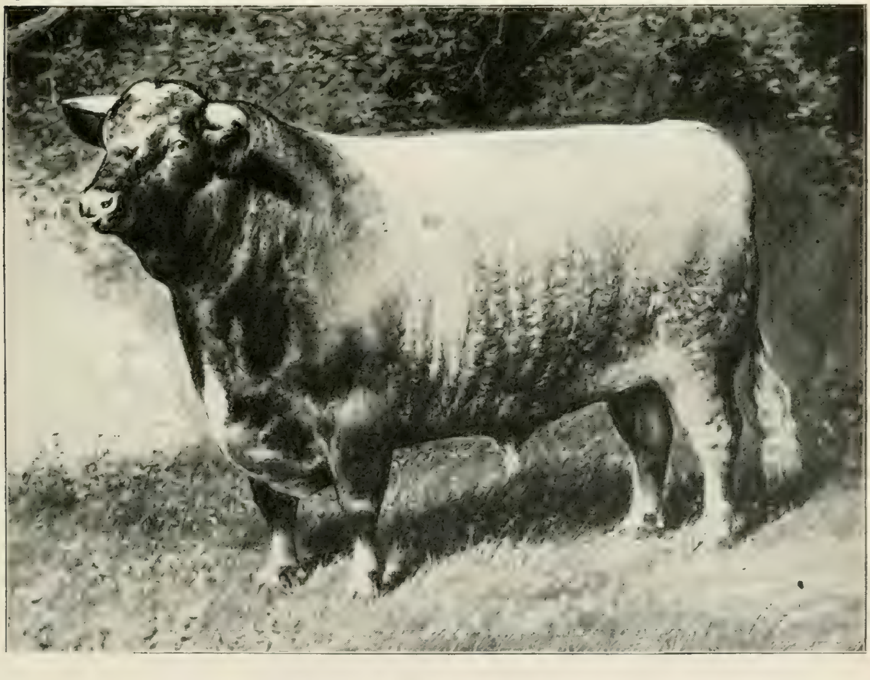
LEGISLATION NEEDED FOR THE PROTECTION OF MISSOURI LIVE STOCK.

(Dr. D. F. Lucky, State Veterinarian.)

Mr. President, Ladies and Gentlemen:

In choosing the above subject I do not mean for you to infer that the present State laws pertaining to live sock are in any manner greatly deficient. In fact, I believe that we already have the most adequate set of laws for controlling contagious diseases of live stock to be found in the United States. Section 10547 authorizes the State Veterinarian or a deputy to place in quarantine any live stock which are capable of spreading a contagious disease, and requiring them

Hereford Bull, "Defender," 140,037. First prize winner, two-year-old Hereford, St. Louis World's Fair. Sweepstakes at Minnesota State Fair, 1903. Owned by C. G. Comstock & Son, Albany, Missouri.



Shorthorn Bull, "Choice Goods," 186,802, grand champion prize winner St. Louis World's Fair—greatest Shorthorn Bull in the world. Owned by Tebo Land and Cattle Co., Clinton, Missouri.

kept in such a way as to prevent the disease from spreading from them. Section 10550 authorizes the quarantining of any infected premises, such as stockyards that have been occupied by scaby sheep or cattle, pens or stalls by horses affected with glanders, or pastures infested with fever ticks. This section also authorizes the veterinarian to prescribe the mode of disinfection of such infected premises, and the disinfection must be thoroughly done before such premises may be used in connection with healthy stock. Section 10551 authorizes the Governor to issue a proclamation quarantining against any other state or territory in which any dangerous contagious disease of live stock is known to exist. Section 10552 authorizes the Governor to proclaim any municipality in this State under quarantine, and to prescribe rules under which stock may be removed from such locality. Section 2327 requires all hogs that die of a spreading disease to be burned or buried by the owner within 24 hours. Section 2322 forbids the importation, driving upon public highways, hitching or watering at a public place, selling or offering for sale any horses affected with glanders or nasal gleet. The latter term means any snotty discharge from the nose from whatever cause. Section 2330 forbids the importation into the State of any scaby sheep, and also prescribes against driving them on the public highway, selling or offering them for sale. Section 1166 requires railroad companies to furnish shippers of live stock cars that have been properly cleaned. Section 1167 requires the railroad companies to pay shippers for loss of live stock which die of contagious disease by reason of the non-compliance with section 1166.

In addition to the above laws and some of minor importance that we already have we need to have passed as soon as possible a bill to authorize the controlling of dogs capable of spreading rabies, and another to require a standard of qualification on the part of those practicing veterinary surgery.

Section 10547 of the present statutes uses the word "live stock," and I am advised that dogs are not considered by the courts to be live stock, therefore, it would not be legal to quarantine a dog, even after he had developed rabies, much less quarantine the dogs through a neighborhood which have fought with and been bitten by a rabid dog. A law ought to be passed, and the sooner the better, authorizing the State Veterinarian or his deputies or some local officer to place in quarantine, for at least two years, all dogs that have had any chance whatever to be bitten by a rabid dog. Rabies is gradually becoming more common in the State of Missouri, and it is high time the

disease be properly controlled. During the past few years I have been called to examine cattle and other stock which were affected with rabies, and have found in almost every case the rabid dog which caused the disease had fought with numerous dogs through the neighborhood. Such dogs as were exposed to the rabid dog were usually confined for about nine days and then turned loose without any further precaution. They should have been absolutely confined for at least two years, until the danger of their developing rabies had passed. It is no uncommon thing to hear of one of the exposed dogs going mad six months or a year after having been bitten, and in many cases after the visit of the rabid dog had been forgotten. In two different towns I found in each as many as 65 dogs that, as far as we could tell, had been exposed to the rabid dog, many of them having actually fought with it. Under the present law it is not considered that the State Veterinarian has any authority to quarantine or cause to be confined in any way such dangerous dogs. Some legislator who will take this matter up and provide a proper bill has a chance to do a good piece of work for the protection of the live stock of this State, and incidentally the human family.

Almost as bad as the damage done by rabid dogs is that done by ignorant persons who profess to be veterinarians, and who are going about over the State offering their services to farmers who know far more about the diseases of live stock than they themselves, and charging exorbitant fees for giving stock medicine which actually, in many cases, does more harm than good. The states of Iowa and Illinois have already passed laws requiring veterinarians before beginning to practice to pass an examination. It seems that nearly all of those who by reason of incompetence were not allowed to practice in Iowa and Illinois have come to Missouri. The result is that the farmers of Missouri are afforded no protection whatever from such invaders. There are quite a number of competent, intelligent and honest veterinarians practicing in the State of Missouri, but nothing like the number needed for the proper care of the live stock of this State. The number of ignorant quacks far exceeds the number of competent men, and the profession in the State today is judged largely by the ignorant members of the profession. The competent veterinarian, as I am glad to say, is gradually becoming understood and appreciated by the live stock producers of this State. He must have an education practically the same as is required to make a man a good medical doctor. I believe, in addition to this, that the veterinary practice requires more originality and native ability, inasmuch as the dumb brutes have a very feeble way of expressing their ills.

It is also essential that the veterinarian should be sober and honorable in his actions. I am so impressed with the needs of the live stock producers for better veterinary service that I have prepared a bill which I propose to ask some member of the legislature to introduce during the present session. Out of due respect for the constitutional rights for those who have engaged as much as three years in the veterinary practice for a livelihood the bill which I have prepared provides for them to register as veterinarians. It is provided for the graduates of veterinary colleges now practicing in the State to register. After January 1, 1906, the bill provides that all who begin to practice shall first pass an examination before the veterinary examining board, which examination shall be strict enough to fully test the competence of the applicant. The expense of the registration and holding of examinations shall be provided for by charging each applicant for registration a small fee, so that no money will be asked from the State treasury. I think this is one of the most important pieces of legislation from the live stock producers' standpoint. It will result in better veterinary service, and will have a tendency to bring the profession up to its deserved position. It will especially be a great benefit to the State Veterinary department in controlling outbreaks of contagious diseases which occur over the State. I sincerely hope that the stock raisers will insist upon the passage of this law. Each farming community of the State ought to have one of its young men educated in veterinary surgery, and use him instead of the ignorant impostors who are so common today.

[The bill regulating the practice of Veterinary Surgery referred to above passed both houses of the Legislature, and has been approved by the Governor, and is therefore now a law.—Secretary.]

While the appropriation of money for the veterinary work does not constitute new legislation, it is a matter with which the Legislature deals every two years, and it is as important to have an ample appropriation made for the veterinary service as it is to have laws upon the statute books to provide for the controlling of contagious diseases. I believe that the live stock producers of the State ought to be in closer familiarity with the work in controlling contagious diseases, and not only insist upon the passage of laws, but upon the appropriation of a sufficient amount of money to properly care for the live stock of the State. Heretofore the funds provided for in the veterinary service have not been sufficient. With the money provided the ordinary outbreaks of disease have been fairly well controlled. There is one important incident, however, which shows that the breeders of the State are not alive to the situation, and are not in all cases getting what is due them from the Legislature. For some two years

now hog cholera has been quite prevalent in many parts of the State of Missouri. I have received notices from the various public stock-yards of the receipt of 441 shipments of hogs from the State of Missouri which were affected with hog cholera. The disease began by the importation of stock-hogs into the State from the southern and western states to which to feed our enormous corn crop of 1902. Anticipating the outbreak of hog cholera I made a lecture on the subject at Palmyra at the first farmers' institute that was held during the fall of 1902. The lecture was made on August 27, and gave the warning that the promiscuous importation of stock-hogs into the State would result in severe outbreaks of cholera among the hogs of the State, and advised that feeders be careful in the selection of stock-hogs, that they disinfect the car in which the shipment was made, and that such imported hogs be kept isolated and in quarantine for 30 days before being exposed to any other hogs. I furnished copies of this advice to all of the agricultural papers of the State, and to the market reports, in all of which it was published in full. The regular biennial appropriations were not sufficient to allow the veterinary service of this State to take hold of the situation as should have been done, and during the session of the Legislature of 1903 I asked for $6,000 extra appropriation with which to control hog cholera. I know of single counties that I could have saved ten times that amount if that appropriation had been made, yet when the attention of the members of the Legislature was called to this bill they simply passed it up without apparently giving it any thought.

The breeders of this State ought to be in such close touch and sympathy with all veterinary and agricultural departments that when such a request is made of the Legislature that it would be promptly granted. I estimated that with an appropriation of $6,000 the hog cholera could have been controlled at that time. Since then the disease has become so prevalent that its control is out of the question. A judicious expenditure of $100,000 during the next six months would not stamp hog cholera out of the State of Missouri.

OUR CALLING.

(S. P. Emmons, Mexico, Mo.)

Good farming and good live stock; good reading and right living; these couplets will not only insure a competency in temporal things, a full storehouse here, but tend to give us an inheritance that is eternal

in the land beyond. Man's success is not measured alone by the amount of his bank account; Columbus, Fulton, Morse and a host of others are not known for their pecuniary success. It matters not to us whether they died rich or poor, our legacy is the same. The great universities that dot the political centers of the states of great America are dependent largely on the material stream that flows from the large aggregation of wealth that surrounds them; but the end for which they are maintained would be lost were it not for the boy grown on the American farm. With the love of freedom born in his heart, with strong arm and active mind, and a brave heart he goes forth to fill the halls of our colleges, universities, the marts of trade, or the offices of the great transportation companies, ambitious to do the best services in any department he may fill. Go into the great metropolis of our nation, enter the banking, commercial and professional institutions. Who mans them? Seventy-five per cent of the founders and heads of these institutions are from the rural districts. The great stream of rural brawn and brain continues to flow, and must for years to come, into that boundless, busy field of responsibility, that must needs be filled by the very best material obtainable. The purpose of man is to do something, and that something to aid his fellow-man. The great west that so blesses mankind to-day would be a wilderness, were it not for the pioneer farmer, who for the cause of freedom and home, braved the storms and perils of the great unknown, and became the precursor of better things to come; then comes the live stock improver (the cause for which we stand to-day) disseminating the improved blood little by little until the great valley of the Father of Waters is known the world over for its wonderful progress. Flocks, herds, studs, shops and mills dot the greatest of all lands. 'Tis said the strength of the nation is in its homes and the best home is the rural home; there the owner is king and lord of all. Father, mother, children, there is no home without the combination. I know some of our great breeders have lived and died old bachelors, and some farm homes have existed without children, but they cannot have been ideal.

Surely the man who builds up a great herd should have a life partner, one who shares his sorrows, sympathizes in his losses and exults in his victories, whether great or small. A farmer should have a farmer's wife. Some city people are very much infatuated with rural life, but it's only a fancy. They visit their country cousins and friends, and see nothing but the glitter and silver lining, and have no conception of what labor, thought and energy was necessary to have gained and maintained these ideal rural homes.

Our field for thought and obtaining knowledge is not limited. Do we wish a diversion, it is at our door. Combine with the study of producing the best live stock, the elements that enter into the soil, the crop best adapted, the fertilizations necessary both to maintain and supply the needed elements, the selection of the best seed, the quality of the seed needed in the selection of the foundation stock for the flock, the orchard and the field, and use of sires to maintain and increase the value of the flocks and the herds; the selection of the soil for the field and the garden, then combine with all this the most approved methods for the cultivation and with this all a love for the beasts that graze the field, and you have before you a life's work worthy of the best efforts of man. Boys, do you want to leave the farm and enter mercantile pursuits? Remember ninety-five per cent fail; for every merchant prince, thousands have been made bankrupts. Would you prefer one of the professions and seek eminence through its channel? Remember there is "room at the top," and few there be that get there. Is it your ambition to build your monument in the political field? Let me warn you the path is strewn with broken hopes, and yet the Presidency is not beyond the reach of those who till the soil. If our ambition leads us to reject the farm, the flock and the herd, to seek political fame, remember it's the roughest and most uncertain road. We are reminded of some of the greatest Americans, Henry Clay, Daniel Webster, John Jay, Thomas B. Reed, James G. Blaine, and many others, whose hopes were blasted when they were seemingly in reach of the topmost round. Would you abide on the earth and live to bless mankind and the lower animals, whom God created for your benefit? Stay with the field, the flock and the herd. The improver of live stock is truly a benefactor; he who causes two blades of grass to grow where only one did live, and the cereals of the earth to double their former yield, is a double blessing to mankind, and history does not withhold her tribute to such. The grand old Scotchman, William S. Marr, had three sons, one a minister and the other a doctor, and the late W. S., Junior. I doubt if there is an American today who would have ever heard of them but for the venerable sage of Upper Mill. The monuments we build at the graves of our dead, are for naught but to keep our memory green, but the marble will have crumbled and the granite broken long before the names of Colling, Bakewell, Booth, Bates, Mainard, Ducie, Campbell, Cruikshank, Marr, Duthie and a host of these and others who developed different breeds of cattle, as well as all those who have bred and fed well, will have been forgotten. No, gentlemen, it is not only our privilege to write our names indelibly on the tablets of time, but to enjoy beyond measure

the fruits of our labor while here. The seed we sow, and the grass that we grow, is not only the main dependence of our life and comfort, at home, but the hope of the State, the nation and the world.

We can do without some things, but the world would perish but for grass, and while the Isles of Great Britain produce the most luxuriant sward, it was left to the Great Valley of the Mississippi to produce the man whose genius laid that imperishable tribute at her shrine, with almost an immortal pen, and the name of Senator Ingalls shall survive as long as time shall last. Then do not make haste to leave so honorable a calling with so fruitful prospect of returns for honest toil and effort; let us inscribe on our banner the motto taken from one of our best farm papers, "Good farming, clear thinking and right living." And may we fill this world so full of good, intelligent, useful farmers and breeders, that the very heaven shall be forced to prepare a field for our future usefulness.

THE PUBLIC SALE AND THE PURE BRED STOCK BUSINESS.

(Geo. P. Bellows, Maryville, Mo.)

The close inter-relation of the public sale to the pure bred stock business is coming to be very generally understood, as evidenced by the steadily increasing number of auction sales of this class of stock annually being held. The public sale system of disposing of pure bred stock has grown amazingly in popular favor during the last decade. The increase in the number of auction sales during this period has not been the result of a mushroom growth, but has been the natural unfolding of legitimate causes, the results of which have been of untold benefit to the farmer. Since the farmer is engaged in the most important business or occupation known to man, and since the public sale and the pure bred stock business is one of the chief mediums through which the farmer and his calling is to be elevated and dignified as never before, it is plain to be seen that much thought should be given a subject of such immediate importance. The primary thought with reference to this subject is, "The Pure Bred Stock Business," the "Public Sale" being only a means to the end, and, therefore, of secondary consideration in this connection.

The farmer who has at heart the future financial, educational and moral welfare of himself, his family and his children's children, can

illy afford to ignore the question—whether or not he will interest himself in the matter of breeding pure bred stock?

Throughout the corn and tame grass belt of this country of ours the best farm lands have become so valuable—worth so much money per acre—competition so close and margins on staple products so narrow, that the farmer who breeds, feeds and markets the low grade or scrub animal, be it horse, cow, hog, sheep, or any one of our better known domestic animals, cannot hope to do so and realize above the bare cost of production, indeed he can count himself lucky if his time has not been given to the running of machinery of the farm at a loss.

No American citizen should be content in this country, fraught with such wonderful possibilities, to run his business upon the plane of bare maintenance, for, in the great, broad sense of the term, we cannot long stand still, but must either advance or go backward.

Should the above propositions be admitted, and we think they must be, then the question of a remedy arises. We will not undertake to say that the pure bred stock business, of itself, is a "cure all" for the multitude of ills which beset the farmer in the management and execution of his business; but we do unhesitatingly assert that the farmer of average intelligence who will earnestly put himself to the interesting and pleasant task of studying the pure bred stock business, and you will then gradually and cautiously put into actual practice the sound principles which he may learn from reading, observation and experience, will have taken a long stride toward correcting many of the symptoms suggesting stagnation, unthrift and everything antagonistic to the principles of progress as applied to farming and farm life as a pleasant, dignified and noble occupation. Those who for one or several reasons have failed to give the matter of breeding pure bred stock any serious consideration and, therefore, have never taken the first step; or those who have concluded because some erratic fellow who had more enthusiasm than sense, capital or experience, failed; it would, therefore, be foolish, if not dangerous, to invest in pure bred stock, will doubtless, and of right should expect us to point out the way in which they can safely start in this business with the reasonable assurance of success to the extent that will bring about financial, educational and moral uplift. To do this to the entire satisfaction of myself will be a task for which I confess my inability, but, nevertheless, I shall always be found willing to contribute my mite toward bringing about the desired results. The class of men with which we have to deal in this connection may be divided into three groups; first are those who are hard-headed, ignorant and will not listen to argument or be convinced even after actual demonstrations

A grand group of Shorthorn Bulls, owned by C. D. Bellows, Maryville, Missouri.

have been made; the second group embraces a very large class known as the thoughtless, indifferent, happy-go-lucky sort of fellows, who rarely give any subject serious or deliberate consideration; then there is the third class which includes the uninformed, but ambitious and willing to learn and profit from the knowledge and experience of successful men who have gone before them. It has been said that "There are none so blind as those who will not see." It is, therefore, almost useless to spend time in the vain effort to convert the proverbial unbeliever—the man who without good reason sets his head against progression. In order to exert any beneficial influence upon the class enumerated in our second group it is necessary to make forcible, direct appeals, and this is scarcely ever accomplished except at public sales and by the personal force and logic of the auctioneer who, for the time, may, perchance, have one or several of this indifferent class of people within his influence and thereby induce him or them to become purchasers. Even when this is accomplished the chances are that in quite a per cent of instances the new convert will revert to his original shiftless, indifferent habits and, as a consequence, little ground will have been gained, because, as in all other businesses, the breeding of pure bred stock to be successful requires studious habits and a willingness to give attention to, at least, the details of ordinary care and management. It, therefore, remains for us to conclude that a very large majority of the new recruits in the future great army of improved stock breeders must come from the third or last class of individuals herein referred to. To the majority of men "money talks," therefore, one of the first things to be done is to convince the unconverted farmer that by discarding the scrub, grade or nondescript sire and by replacing him with a good and carefully selected pure bred he will thereby be money in pocket instead of out. That such is the case is no longer a theory, but is a fact being demonstrated in every enlightened community, also at the live stock markets of the country on every business day of the year.

Every business that permanently succeeds must rest upon a broad and well grounded foundation. No business is more permanent than that of farming, because the entire population looks to the farmer to be both fed and clothed. The farmer operates the machinery supplying the raw material which furnishes the world with all of the necessities, also a multitude of the luxuries of life. With this responsibility, never ending demand and unsurpassed outlet for our products, we have not to consider so much the finding of a market as we have to give thought to economical and profitable production.

Taken collectively the farms of America, in point of value and productive importance, outrank all other manufacturing institutions combined. Among the manufacturers of commercial commodities vast sums of money are wisely spent in the investigation of questions and principles, the application of which will reduce the cost of production, raise the efficiency of the article manufactured, and also to perfect the question of the distribution of the finished product with the greatest economy. This work has been carried to a wonderful state of perfection and when the time comes, if it ever should, that even one-tenth of the intellect and capital spent in the application of real, not imaginary, economical principles of production with reference to the farm as a manufacturing institution, then our country will bloom as a rose and the scrub farmer and the scrub animal will be a vanishing species.

Live stock farming—by which is meant keeping live stock on the farm—is, and in the future will be the only safe means of maintaining the productive qualities of the farm manufacturing plant. Without live stock the capacity of the farm plant is annually decreased because of the inability to return to the soil the fertilizing elements required to sustain the maximum limit of production. Some will doubtless say: "What has all this to do with the pure bred stock business, as the scrub animal will return as great an amount of fertilizing element to the soil as the pure bred?" This is true, but where the pure bred, or high grade, excels the scrub is in his ability to consume the grain and forage crops of the farm, and, as a machine, most economically convert them into a product for which there is always a demand for the best at top market values. Experiment station work, market reports and the practical experience of our most intelligent and successful farmers, breeders and feeders, as well as expert buyers, packing house owners and conveyors, are all on the side of the pure bred or the high grade animal as being consistent money makers on the farm. The above argument applies to the production of the commercial products in its live state and forms the basis for our contentions with reference to the advisability of making the breeding of pure bred, recorded stock a part of our farm business.

The fact that it requires the pure bred or high grade animal to acquire the results above mentioned argues the absolute necessity of the perpetuity of the pure bred animal for breeding purposes, else, in a very few short years we will find ourselves scarce of this vitalizing material. The natural tendencies of all improved animals and plants are to deteriorate unless cultivated and given congenial environments and opportunities for improvement and development. Man himself is

no exception to this rule. The truth of these statements points the moral that there will always be a demand for pure bred breeding animals such as will insure the producer of the good kind a profitable market. But, I fancy, some one inquires, "Where does the economy in breeding pure bred stock come in?" Speaking from my own experience and a very wide field of observation I can say that the farmer who breeds and grows pure bred animals, taking as a basis the average of the sales the country over, realizes from two to ten times as much per head for the surplus product of the herd, the relative increased amount depending upon the quality, breeding, condition, etc., of his animals, than does his neighbor farmer who breeds common stock.

Then I would ask: "Is it not more economical to shelter and feed one animal that will do the work of from two to ten, than it is to house and feed the larger number?" We say yes and can point to innumerable instances to prove the assertion. Now as to the educational advantages to be derived from keeping pure bred stock. No sooner is the first pure bred animal placed upon the farm than the educational influences are set to work. The neighborhood gossip is at once turned to something better and which stands for improvement. The local paper, if it does its duty, announces the advent into the community of an animal of improved breed and type. As a result of all this the owner and his family begin to realize a degree of pride in the fact that it has been imposed upon them to be leaders instead of followers in their community. In order to maintain this enviable and commendable position they begin to read up and keep themselves informed with reference to the history of the breed, its ancestry and other matters pertaining to care, feed, management, etc., to the end that their life and vision becomes broadened by being brought into touch with progressive movements of the times.

Soon the agricultural college and the courses in live stock husbandry are learned of, finally the son or father or both takes advantage of the short course in live stock judging and thus a new world is opened up. After that fairs are attended and the awarding of prizes is watched with awakened interest. By this time our candidate is associating himself with the best class of men, whom he finds congenial company because they are sensible and willing to give information, gained from the field of experience, which, to the young man or beginner seeking knowledge, is invaluable. A public sale is attended and here, too, a new field is found for observation and instruction. By this time the breeding of pure bred stock is a subject that has taken hold of the family and has not only been the means of broadening their views of life, but has also brought them into prominence as

progressive people, and soon the sons and daughters are in demand from those seeking to employ young men and women of good families to fill responsible positions of trust at remunerative compensations. The sons and daughters from such families also invariably enjoy superior advantages when it comes to the matter of selecting a life companion and thus the educational influences arising from that first start in the pure bred stock business goes on and on from generation, wielding an immense influence for good in their own immediate community and to society in general. The improvement of one's moral status, as well as the educational advantages obtained from breeding pure bred stock, is also a matter worthy of consideration. The more nearly one's time is occupied in studying questions relative to any form of improvement, the less time they have to devote to the trivial non-essentials of life. One of the first things to be learned by the beginner in the breeding of pure bred stock is that all future substantial success in the business depends upon his standing and reputation as an honest man. Absolute and unqualified honor is an essential requisite to success in this business, because a man's word and representations are the only guides we have as to the identity of his stock and the reliability of their breeding, age, etc. If it is once learned that a breeder has misrepresented the age, breeding, or anything pertaining to record of his stock, he soon loses caste and is viewed with suspicion thereafter. Thus it is that a man's moral status is given additional impetus and support after he has engaged in the breeding of pure bred stock.

Fearing that this article will be too long we will but briefly refer to the "Public Sale" feature of the subject. The "Public Sale" along with the agricultural press, the agricultural college and public exhibitions of fine stock is exerting a mighty influence both in an educational way and in the distribution of such stock. Many a farmer attends a public sale and secures his first impression of the vital importance of breeding improved stock. Here he learns by way of actual demonstration that it is profitable to breed and sell pure bred animals for breeding purposes. In this way the well informed, intelligent auctioneer is in position to do much good and be of advantage to both the buyer and the seller. I have heard prominent breeders declare that they had received some of their most valuable lessons from attending public sales. There was a time when the public sale was looked upon with suspicion, but that time, I am thankful to say, is passed and today no business is run upon a higher plane of business ethics than the selling of pure bred live stock by auction. As a convenient

and satisfactory means of disposing of one's surplus stock, or for closing out one's business, the public sale has come to be recognized as being indispensable.

How to conduct a successful public sale, when and where to hold it, how to advertise, when to begin to condition the stock for sale, just the kind of catalogue to issue and when it should be out, the auctioneer to employ, how to entertain your customers sale day and various other questions are each subjects which might be considered at some length, but they are outside the legitimate limitation of our subject. In conclusion I will say that, in my opinion, the inter-relation of the public sale and the pure bred stock business will, in the future, grow stronger and become more potent for good alike to the breeder, buyer and the public in general.

IMMUNIZATION AS A MEANS OF CONTROLLING CONTAGIOUS DISEASES.

(Dr. J. B. Tiffany, Agricultural College.)

Mr. President and Members of the Live Stock Association:

It is getting late and I did not expect to have to speak to you, but as I am called upon I will condense my remarks as much as possible.

My subject is that of "Immunization as a Means of Controlling Contagious Diseases." The Veterinary Department of this University is in the habit of sending out a great many doses of blackleg vaccine to the farmers, and the thing that has appealed to me most is that a large number of these doses go out in small quantities, showing that the farmers who are raising from five to fifty calves are sending for this blackleg vaccine for the purpose of inoculation. That, seems to me, points to the fact that the small farmer is beginning to use this biochemical product in his work, and in their letters they frequently ask a great many questions as to the use of blackleg vaccine and occasionally some of the reasons for its use and the methods of making it. It occurred, therefore, to me that it would be interesting to you to know something of the theory on which the subject is based and the explanation of the dangers and limitations of the use of various vaccines. This talk will apply to other vaccines besides the one that I have mentioned, all of which come under these principles.

You know that when an animal passes through a dangerous infectious disease it becomes immune, does not readily take that particular disease again, and is more or less resistant to the disease.

This has been observed for a long time, and is known as natural immunity. Some scientific people came to the conclusion that they could produce a disease in an animal, establish immunity thereby, but not produce the disease in such a form as would kill the animal, and in that way save a great many head of stock. That theory is worked out until now we use vaccine commercially for blackleg, anthrax, etc. There is a theory or hypothesis on which all this is based, and I want to explain it briefly so that I can point out something of the danger in its use.

The theory is that when some pathologic organisms once enter the system they commence to multiply and elaborate a poison known as toxin, which is carried to the various parts of the animal body through the circulatory system and produces what we know as disease. The poison from the various different pathogenic organisms produces a different series of symptoms which we recognize as specific disease. If this production of toxin-poisoning went on indefinitely the result would be the death of the individual, but nature has provided a means to hold this in check. There is thought to be produced a material which we choose to call anti-toxin whenever there is a disease caused by the presence in the animal body of certain organisms. The disease is counteracted by this substance known as anti-toxin, and we make use of this anti-toxin in various ways. The one disease in which we have come to use it commercially is that of tetanus or lock-jaw.

In some cases anti-toxin for tetanus is proving very efficient, while in others it is not, and the reason we attribute to this difference in results is that after the disease has gone so far that the poison has entered the different organs and has made certain anatomical changes, we know there is no agent that we can introduce into the system that will check the disease; whereas, if the anti-toxin is injected into the system previous to the poison's once reaching the center, it is going to work and it will neutralize the poison and the animal may recover.

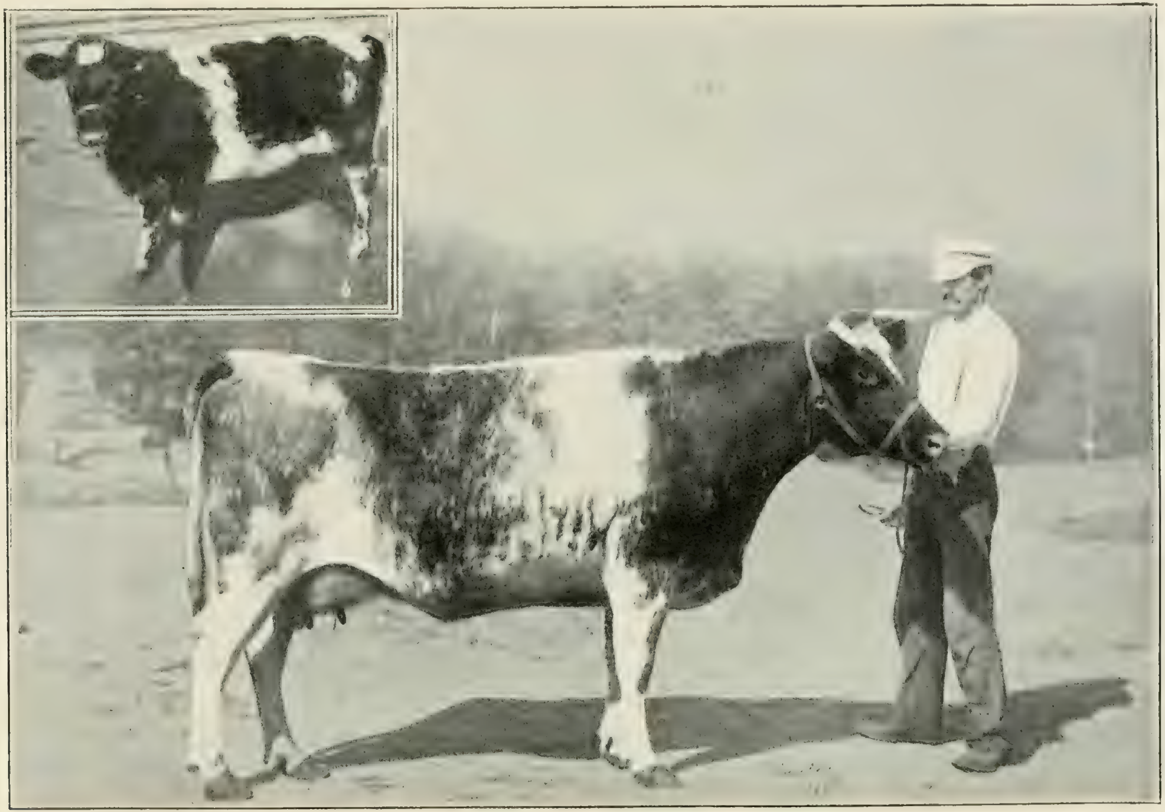
In vaccination, as you know, we introduce into the animal organism a deadly germ and this germ has been so treated, i. e., has passed through certain environments, certain uncongenial conditions, such that it will not produce the disease in its original vigor. But at the same time it will produce some toxin, and this encourages the animal system to produce the anti-toxin or neutralizing agent, and from this the animal becomes immune and resists any subsequent attack of the disease.

You see, if we can by keeping these germs under unfavorable con-

ditions get them in such shape that they will not produce a disease like blackleg in its most virulent form, we also may have a condition in which we can grow these germs in such a way that they will produce the disease in a more virulent form. That is shown in the disease of rabies or hydrophobia. In passing the germs of that disease through rabbits we get a disease which is much more virulent, the period of incubation is considerably reduced and the disease appears in a more dreadful form. It so happens that these organisms that we introduce into an animal system are capable of either becoming deadened or reduced in strength or becoming stronger and more virulent. Furthermore, these attenuated organisms once introduced into a system also may be brought back to their original strength and their original ability to produce the disease, and that is what has happened in a great many cases—has happened in some cases—not to put it too strongly, especially with the virus or vaccine of anthrax. You do not have anthrax in this State so very much, but in some states it is quite serious, and when it once enters a community it carries off stock very rapidly. In order to protect themselves in various districts, the stock raisers have brought this vaccine of anthrax into the community and as a result they have started the disease. Some have attributed it to the fact that the vaccine was not properly made, that the company making the vaccine did not take the proper care and got into it some organisms which were not sufficiently attenuated, but it might have been, and we have proved it possible many times in the laboratory, that the germs have been attenuated, but by passing them through individuals that were particularly susceptible to the disease, they will bring the organisms back to their original strength and make them as dangerous as when the laboratory experts began their work upon them. The danger is not so great in blackleg vaccine because the germs seem to be more under our control, but in anthrax there is this element of danger, and there is a possibility of such danger in blackleg where we introduce the vaccine into a new community. Of course, where the disease is already prevalent and present, where a man is directly surrounded by these diseases, then the only thing for him to do is to inoculate his stock with the vaccine that he can secure, to prevent the disease. He has to do it then as a protection, but in a locality where these diseases are not present, to go ahead inoculating stock with the various chemical products of vaccine companies is an exceedingly dangerous thing. They do it in the West sometimes as an insurance measure. Some people spray their fruit trees and vines as a protective measure, not knowing that any disease is going to

attack them, but simply as a protective measure to guard against the possibility of insect ravages. The same men that become too progressive might be induced to do the same thing with their cattle, i. e., inoculate them against various infectious diseases. As a result there would be this possibility of introducing virulent organisms into a community and this is the point I wish to emphasize.

I will say a word about the vaccine for hog cholera. We have a disease in hog cholera which is not suitable to the use of any anti-toxin, nor is it suitable to the method of exterminating such as we use in tuberculosis and glanders. We cannot use these methods with hog cholera, and the only thing we have to rely upon is a vaccine. The demand for hog cholera vaccine has been so great that all over this country companies have been putting out a vaccine against hog cholera, and every year there is some new concern organized for this purpose, but so far all have proven failures. Some of them will sell for a short time—a year or two—and people who use them feel that they have done some good. The probability is, the reason that in some cases hog cholera vaccine works, is that some time before the man sends for his vaccine the hogs are suffering from the disease, and those which are attacked early in the season are the ones most susceptible; that is, the ones that produce the least amount of anti-toxin in their bodies, which tends to check the disease. Those hogs that will produce the most anti-toxin in their bodies are the ones least susceptible and the ones that take the disease last in the herd. Now, the owner of the stock waits some time before he sends for this vaccine, then, after he sends for it, it takes some time for it to get there, and, according to the directions, it will take a week or two before the vaccine begins to act, and by that time all the more susceptible hogs have been killed off, leaving only those that are resistant to the disease and would recover, anyway. In that way the various hog cholera vaccines have been supposed to be useful, but in truth we have not found a hog cholera vaccine. Still, from the nature of the disease—from the fact that there is immunity in hog cholera—it seems that there ought to be a hog cholera vaccine. Many times in making an examination of a pig that has recovered from hog cholera, we find the hog cholera organism present there, which would indicate that there is a large amount of anti-toxin in the animal's body which stops the disease and prevents its further occurrence. So we have evidence that in the future we will produce a hog cholera vaccine, and it is the plea of the farmers of this country that there be a vaccine produced for this purpose. We are receiving in this department a great many letters



Rowena 2d and her calf. Dual purpose Shorthorn cow, owned by H. J. Hughes, Trenton, Missouri, Official record of Rowena 2d is 4,053 pounds of milk, test 4.3, making 201.13 pounds of butter in 120 days, gained during time 139 pounds in weight.

inquiring about this vaccine, asking if there is not one that we can recommend, all showing that there is a tremendous pressure for such a product.

There have been in the past some very able men working on this project, but they have largely given the matter up in disgust, after trying all the methods that they knew. But since that time there have been a great many new things found out about the subject of immunization, and now we believe that these new methods should be applied to hog cholera. At present you know that Dr. Connaway is in Europe and is making a close study of this matter. He is studying a disease somewhat similar to hog cholera—an acute disease known as Rouget. They have a vaccine for this disease which is efficient, and Dr. Connaway is making a careful study of this disease, and we hope on his return he will be the best prepared man in this country to investigate the matter of hog cholera and provide some means of immunization, which is so sorely needed.

THE RELATION OF AGE AND CONDITION TO PROFITABLE CATTLE FEEDING.

(Prof. F. B. Mumford, Acting Dean, Agricultural College.)

I have been impressed with one thing in these meetings here, and that is that most of the farmers and stock breeders want to know all there is to be known about all of these subjects. The farmer wants to know immediately whether it is best to feed corn and linseed meal to hogs or some other ration. They want to know everything as soon as possible. That is all right. That is what the Experiment Station is for, to find out these things, and to find out the facts that the men who are carrying on the business of Agriculture want to know.

At the same time it is not so easy and simple a process as perhaps some of us have been led to believe. We knew a whole lot more things a few years ago than we know now—at least we said we did, and were more positive and more dogmatic about it then than now.

I have been impressed with another thing, namely, when some one man has been successful in feeding animals and paid particular attention to some one thing, he may attribute his success to that one thing, but at the same time he fulfilled all the other conditions necessary for successful feeding. The longer we experiment with feeding cattle for the production of beef, the more difficult the question becomes and the more complicated the problems involved. It is a much simpler

matter to investigate the influence of different methods of feeding and different kinds of feed with dairy cows than any other animal that we have to deal with, because the product which we seek in the case of the cow is a definite product, one that we can measure daily. We know its composition, and we know every day how much water, how much fat, how much casein, and other solids of the milk the cow yields every day, and by feeding a definite amount we have an accurate measure of the influence of a kind of feed upon a cow. But in the case of beef animals we have no such accurate measure. The only real standard of measure that the experimenter has to determine the efficiency of different kinds of rations for feeding beef cattle is the gain in live weight, and some of you know that the gain in live weight may mean a good deal. Sometimes it may mean a lot of water, sometimes it may mean bowel content.

We try to get around the variations in the bowel content in various ways so that the gain in live weight may be as much as possible an accurate measure. We always weigh the animals at a certain time in the day. We weigh them before they drink any water. We shut up the water troughs before we weigh the cattle, so that the variation is regulated as much as possible. But, even when all that is done, we are not positive that feeding ten bushels of corn for a certain period will result in an actual gain of live weight to the animal; although the scales may say that the animal has gained so much, he may not have gained so much, but may have only filled up so much.

Now, I will not attempt to take up the subject of cattle feeding in all of its phases, nor discuss all of the factors which determine profit in cattle feeding, but I will very briefly mention one or two factors that have been under discussion and upon which we have had some definite statements and about which the practical feeder wants to know the facts in the case as far as he is able; and one of these questions that I propose to discuss is the "Influence of Age on Profitable Cattle Feeding," or upon the profits from cattle feeding, and another is the "Influence of Condition."

It is rather an interesting analogy that we draw between the animal and the machine. It has been stated here several times that the animal is a machine, and the analogy is not one that is far-fetched, and it may be a very useful one. The animal is a machine. The farmer is a manufacturer and in the production of beef the farmer uses the animal as a machine to work over the feeds of the farm—the raw vegetable products like hay and corn—for the production of beef, mutton or pork, and in this production of animal material we

have certain conditions to fulfill. For one thing the feeder is engaged in improving the animal in such a way that it will bring the highest price on the market, that is, will be finished in the best way to supply a real demand. The farmer is also interested in finishing the animal for the least expenditure of money. Two conflicting principles are therefore involved in cattle feeding. We must feed the animals to a point where they will fill the demands of the market. It does not make any difference how much it costs. We must do that. If we are in the feeding business, that presupposes that we are finishing beef for the purpose of selling it, and in order to sell it we must bring it to a certain finish and we want to do that at the lowest expense of feed. There are these two things that we must always remember, and I insist upon these two points. Why? Because a good many feeders are confused in discussing this matter of the cost of producing a pound of gain. The profits are frequently measured in the minds of the practical feeder by the amount of grain it requires to produce a hundred pounds of gain, and that is not a true measure. While we make an animal gain, we must at the same time be pushing him toward a condition of finish. If it was only a matter of producing gain in the quickest and cheapest way, we would buy the poorest and thinest animals we could find that had been poorly nourished for some time and fill them up. As a matter of fact, the first stages of the feeding period are the cheapest, so far as the cost of producing a pound of gain is concerned.

What are some of the factors, now, which lie at the foundation of the practice of finishing cattle and finishing them cheaply? There are two things that bear upon both of these questions, they are the age of the animal and his condition at the time the feeding begins.

One fact which has perhaps been more definitely demonstrated in this matter of feeding than any other, is the fact that the younger the animal, the less feed will be required to produce a given amount of gain. It is not a mere matter of opinion now. We know a young animal will produce a pound of gain with less grain than an older animal of the same kind under the same conditions, and there are in some cases remarkable differences. The attention of feeders was first called to this fact by the men who fed the cattle for the old fat stock show in Chicago. Those feeders commenced with a calf at the time of birth, began to feed it, and fed it continually for one year. They exhibited it as a calf, a yearling, a two-year old and a three-year old. They found that the first year the animal fed in that way required about half as much to produce a pound of increase as in the second

year of that animal's life. And they found that it required considerably less grain to make a pound of gain on the steer 12 to 24 months old than was required to produce a pound of gain on a steer 24 months old and over.

Then the experiment stations investigated the matter. The Michigan Experiment Station, the Iowa Experiment Station and one or two other stations undertook what were called in those ancient days "breed experiments." They undertook to test which was the better animal to feed, the Shorthorn, the Hereford, the Aberdeen-Angus, the Galloway, the Holstein or Jersey, and they began with these animals as young as possible, in most of these experiments, beginning with the animal, say a few months old, and they discovered the same thing, that if an animal was fed from birth to death on full feed that the first days—the young days of that animal—were the most profitable days from the standpoint of the amount of feed consumed. They found the same things true with lambs and pigs. The experiments indicated that young pigs from fifty to a hundred pounds in weight would make a pound of gain with three or four pounds of grain and that 300 pound pigs required five or six pounds of grain to produce the same amount of gain. This has been demonstrated, and some experiment station workers and feeders have come to the conclusion from this data that it is more profitable to feed younger animals than older animals, and so we have heard about "baby beef" animals, fed from the time they are born till they are 14 to 18 months old being made to weigh twelve hundred or fourteen hundred pounds and we are told this is the most profitable way to handle cattle, and their conclusions are based largely upon these experiments that I have just described.

One of the most interesting experiments on this subject I have examined in all the work of Experiment Stations is an experiment conducted by the Central Experiment Station Farms at Ottawa, Canada. They performed this experiment differently than those mentioned above. They employed calves, yearlings, two-year and three-year old cattle under identical conditions, so far as possible, and fed them on the same rations. The results are certainly very interesting to the man who is engaged in making beef. The average daily gain from these animals tested was as follows: Calves 2.14 pounds, yearlings 1.85, two-year olds 1.67 and three-year olds 1.65. The calves gained much more than the others, the yearlings next, the two-year olds next and the three-year olds least of all.

The cost of the 100 pounds of gain was also very much in favor

of the calves, in this instance. The relative costs per hundred pounds of gain for these different ages were for calves $3.60 a hundred for the grain fed; yearlings $4.65; two-year olds $5.70; three-year olds $6.20. It cost almost twice as much, not quite, to produce 100 pounds of gain on three-year old steers as upon calves in this experiment. The profit per steer is as follows: On the calf $14; on the yearling $26; on the two-year old $26, and on the three-year old $16. The calf returned the lowest profit per head and you might immediately jump to the conclusion that therefore the calf is not so profitable as the two or three-year old; but this does not tell the story at all, because you have invested in the three-year old nearly three times as much as you have in the calf. For the same money that it would cost to buy a three-year old, you could probably buy three calves.

In this experiment the actual facts are that the calves cost $3.50 a hundred; the yearlings $4 a hundred; the two-year olds $4 a hundred; and the three-year olds $4.50 a hundred, and they sold the calves for $5.50 per hundred and the others for $3.17 a hundred. These were the market prices. But assuming that all of the cattle were bought for 4 cents and sold for 5 cents a pound, and estimating the profit on a thousand pounds of calves bought at 4 cents and sold at 5 cents and a thousand pounds of one, two and of three-year olds bought at 4 cents and sold at 5 cents, we have the following figures: on the calves the profit is $22.30 a thousand pounds; on the yearlings $11.36; on the two-year olds $7.95, and on the three-year olds $7.10.

Suppose a man had a thousand dollars to invest—and that is the proposition that confronts most of us—which is the best, to invest a thousand dollars in calves, yearlings, or two-year olds for profitable feeding? Assuming that we have a thousand dollars to invest and taking these figures I have given you, of buying the animals at 4 cents and selling them at 5, here are the profits resulting from the feeding experiments on the thousand dollars invested: On the thousand dollars invested in calves at the time of birth, the profit was $557; on two-year olds $198; on three-year olds $177. Do not hold me responsible for the profits that these men made on these cattle, that is not my fault, and it is not my fault if you cannot make the same profit. What I want you to pay attention to is not the absolute, but the relative profit. Now the profit made on three-year olds on the thousand dollars invested in this Canada Station was $177.50, and on the two-year olds it was $198. On the yearlings it was $284, and on the calves it was $557. Now, what does this mean? It means what I have tried to make clear above, that the results of our experiments

have brought out repeatedly that if you can buy young animals at the same price per pound and sell them for the same price per pound, there is more profit in feeding young animals.

Now, I have put a good many ifs in the above sentence and every feeder must do the same when he begins to feed. If we could control the market by ascertaining beforehand what you could buy and sell your animals for, you could speak with some definiteness and figure with some definiteness. But the principle has been demonstrated that younger animals put on a gain for less grain.

Now, if market conditions are such that you can buy and sell them for the same price, the profit is in the younger animal, but our experience in Missouri is that we pay from 15 to 20 per cent more per pound for calves than we do for older cattle for feeders, and when we go to sell them, the older cattle, as a rule, sell for a little more per pound. I am willing to be corrected if that is wrong. Now, I must confess that I am a little skeptical on this proposition—that these results are so unusually large that there must be some special reason for it. Of course I cannot tell what that reason is. The only thing I can do is to give our actual trial here on this farm under Missouri conditions and the figures that we have. We have now in progress here perhaps the largest cattle feeding experiment undertaken to solve one question, and that will be continued for a longer time on one particular line of work than any other single cattle feeding experiment so far undertaken in the United States. And one of the things that we are testing and making foremost in this experiment is this question of the relation of age to profitable feeding. Should the Missouri farmer feed young cattle or older cattle?

In the fall of 1902 we purchased 75 head of cattle and divided them in the course of time into three divisions. One division was wintered and put on full feed about the first of May and sold the 15th of January, 1904. Another one of these divisions was put on pasture alone during the season that the others were being finished, and they were finished this year and sold in December last year and fed from May 1st to December 15th, 1904. They were of the same breeding so far as we were able to secure them. They were of equal quality and ability to gain and they were finished as two-year olds. The first division were finished as yearlings, the second as two-year olds and we will put on feed next May a lot of three-year olds from that original draft of cattle. But we have also fed during that time another lot of yearlings this year in comparison with the two-year olds. We have had 55 head of cattle on feed from May 1st, 1904, until the 15th of December.

We have some figures for comparing on even terms this factor of age on profitable cattle feeding. I do not want you to confuse the rations, although that is another question of growing interest about which we have something definite to say. But I want to call your attention now particularly to the amount of grain required to produce a pound of gain on these cattle at different ages. I will first present the figures for this present season, from May 1st to December 4th, 1904, the feeding period just ended. From May 1st to December 1st, 1904, we fed one lot of 30 yearling Shorthorns in comparison with one lot of two-year olds and the amount of grain required to produce a pound of gain, which tells the story in this case, and the whole gain I will give you.

Lot I was fed on corn and linseed meal and the daily gain was for the yearlings 2.45 pounds, and the grain required to produce a pound of gain was 7.77 pounds. The lot fed on corn and cotton seed meal made a gain of 2.24 pounds at an expenditure of 8.3 pounds of grain. Lot III was fed on corn and gluten feed and they made a gain of 2.23 pounds per day, and it required 7.76 pounds of grain to produce that gain. Lot IV was fed shelled corn alone, and they gained 2.23 pounds per day at an expenditure of 7.27 pounds. These latter were yearlings.

I will now give the results with the two-year olds on blue grass pasture and the same grain rations. The daily gains of the two-year olds were as follows: On corn and linseed meal 2.97 pounds; on corn and cotton seed meal 2.65 pounds; on corn and gluten feed 2.06 pounds; on shelled corn alone 2.51 pounds; the grain required to produce a pound of gain was 8.1 pounds; 8.7 pounds; and 817 pounds respectively.

Now, here we have a much more accurate experiment than the one previously described, because these animals were fed the same season; they were fed exactly the same way the winter previous, and they started into the experiment in the same condition so far as we were able to judge. The daily gain of the yearlings on corn and linseed meal was 2.45 pounds; the two-year olds 2.97 pounds; the amount of grain required to produce a pound of gain was 7.77 pounds and 8.1 pounds respectively. It required less grain for the yearlings than for the two-year olds, notwithstanding the large gain made by the two-year olds, and by the way, this is a very remarkable gain for a lot of cattle for the entire season. It is seldom indeed that cattle make an average of three pounds of gain in a six months' feeding period. With the cotton seed meal the gain was 2.26 pounds for the yearlings and 2.65 for the two-year olds. The daily gain with the

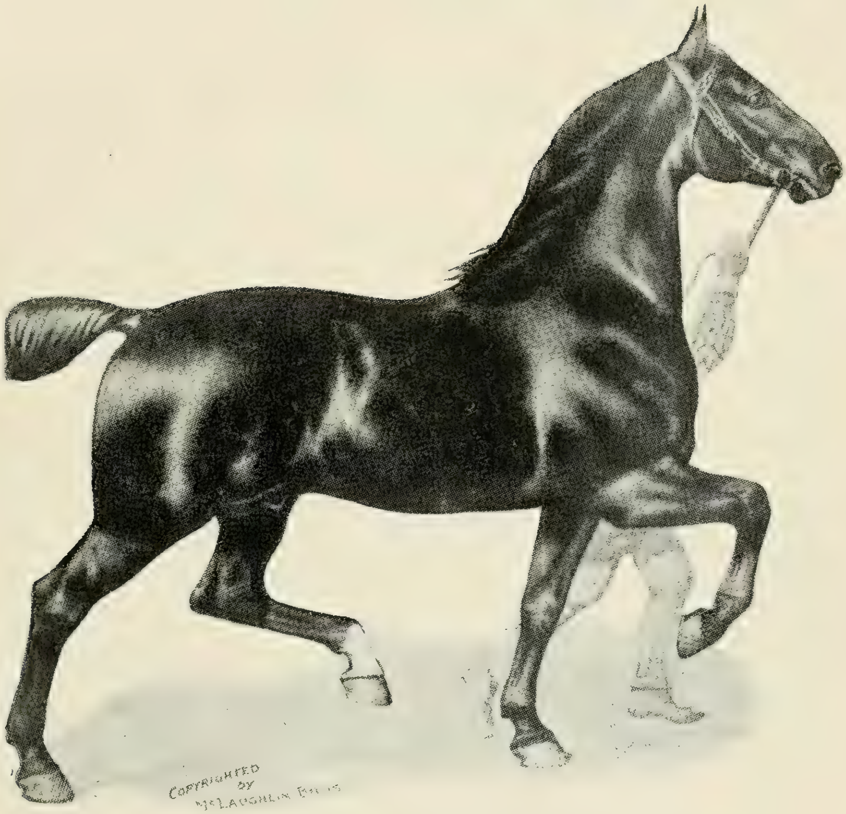
corn and gluten meal was less, 2.23 pounds with the yearlings and 2.06 pounds with the two-year olds. The amount of corn required was always less with the yearlings.

This was an experiment on summer feeding. Three pounds of supplement was fed daily in each case, that is, three pounds of linseed meal, cotton seed meal and gluten feed. The amount of corn varied as the appetite of the animals increased. They were fed as much as 20 pounds of corn during the close of the period.

The relative cost is a question that is almost idle to talk about, as is also the profit that is to be secured because prices of feed and cattle continually vary; but the daily gain on these different feeds under these conditions would remain about the same, and the amount of feed required will remain the same so long as the conditions are similar. These were good cattle—selected cattle, but they were selected in both cases, in the yearling lots and the two-year olds. The two-year olds sold for $7.60. We have not sold the yearlings yet. This two-year old lot brought the highest price in the Chicago market, with one exception, during the entire year of 1904. They were March and April calves. They were sold in December when they were two years old.

Here is my point, and it has a good deal of bearing upon this and the other question that I insisted upon in the beginning; it is not only a question of producing gain cheaply, it is a question of getting a good finish at the right time to sell. The yearlings we have ready to sell after the two-year olds, but if we had sold them at the same time, we would have had to be satisfied with a less price per pound.

There is another question involved, if you consider the profits from cattle feeding, besides this question I have discussed, and I am inclined to suggest this point because it is of vital importance to the man who is making money from cattle feeding. The experiment station men like to find these things out, though they are not primarily interested in making money from every experiment, they are interested in finding out which experiment is most profitable. If you buy a thousand pound two-year-old at 4 cents a pound, you pay $40. If you feed him six months and put on two pounds a day, he will gain 360 pounds. He will then weigh 1,360 pounds, and if you sell him for six cents a pound—you sell him for $81.60. You increased the value of this original thousand pounds two cents per pound in the finishing process and thus make $20. You receive not only the value of this 360 pounds that you put on, which amounts at six cents a pound to $21.60, but you also get your increased value on the thou-



THE IMPORTED FRENCH COACH STALLION "TORRENT," 2813.

Torrent was bred by the most noted of French Coach Breeders, M. Lallouet, who has produced some of the greatest winners of France.

Torrent has a record of 3 kilometers (two miles) in five minutes, made over a sod track with a 140 pound man on his back.

Torrent won the Spohr Trophy at the Chicago Horse Show as the best coach stallion, any age, has been shown at twenty State Fairs and has never been defeated. Won 1st and Grand Championship Prizes at the International Live Stock Exposition at Chicago, 1903. Won 1st and Grand Championship Prizes at the St. Louis World's Fair, 1904. And again at the International in Chicago, 1904, won 1st and Grand Championship Prizes.

Torrent is owned by McLaughlin Bros., importers of Percheron and French Coach Horses, Columbus, Ohio, and Kansas City, Mo.

sand pounds original weight. Suppose this animal weighed only 500 pounds, you paid $20 for him and you put on the same gain, namely 360 pounds. You then have 860 pounds. You sell him for $51.60. At six cents a pound you have the same $21.60 profit that you had before, but you have only $10 for finishing the 500 pounds original weight instead of $20, and that is why it is sometimes better to feed two-year-olds than calves or yearlings, because you get an increased value on their original weight.

The condition of the animal has a bearing upon this question of age. If we buy calves, most of which have not yet been weaned, they are usually in prime condition. Such calves will at first lose rather than gain when placed on feeds.

Go to the market and buy range cattle after they have come 400 miles to the market and have been eating stock yards hay a while and they willl be in good condition to put on gain rapidly and that is another reason why it may not always be more profitable to feed young cattle.

Now I do not want to be understood as saying that it does not pay to feed young cattle. I have been discussing this question from only one view point—the standpoint of the big feeder who buys his cattle, and not from the standpoint of the man who raises his cattle. The man who raises his cattle is a very short sighted man if he fails to feed those cattle from the time they are born until they are ready to go to the market. This is where we get baby beef and that is why it is always profitable. It is unwise and unprofitable for a man who raises a good grade of cattle to keep them until they are two years old. This is a losing business. He should always feed them well and sell them at a young age.

THE PERCHERON AND FRENCH COACH HORSE FOR THE AMERICAN FARMER AND BREEDER.

(Mr. W. M'Laughlin, Kansas City, Mo.)

It is a well-known truth that the horses of a country partake to a very large extent of the characteristics of the people of that country. The people who inhabit Normandy, in the northern part of France, the country in which are raised both the Percheron and French Coachers, are not the sort of people whom Americans ordinarily think of as Frenchmen. These people partake fully as much of their ancestors

from the north as they do of the southern blood in them. They are strong, large, vigorous and broad-minded; in other words, they are more like the people of America than perhaps those of any single nation in Europe.

The horses bred in that country are of the type that one would expect. There is no breed of draft horses in the world that possesses the same strength, the same force, the same elegance of conformation, the same activity, the same ability for moving heavy loads at a rapid pace as does the Percheron. It has been proven without any question, and without danger of its being refuted, that the Percheron horse crosses better and does better than any other draft horse in this country; therefore, the horses brought from France to America are not compelled to undergo any great climatic changes. I am certain that it is due to a great extent to this fact that horses from France have been so successful in America.

The French people have been for centuries aided in the improvement of their breeds of horses by the government. At the present time no stallion is permitted to stand for public service in France until he has been passed upon by the government officials. This has aided very materially in the perfection of both the Percheron and the French Coach breeds of horses.

The Percheron horse is bred in his purity in the district southwest of Paris, beginning about fifty miles from Paris, at Chartes, and extending about seventy-five miles west. It is oval in shape and is about fifty miles wide. In it are some of the most fertile valleys in the world. The country is broken, and on this account gives the necessary encouragement to producing not only a heavy horse, but one with great activity as well.

The Coach horse is bred in the country north of the Percheron, between Alencon and the English channel. They are in no way intermingled, as the line between the district where Percherons are bred and where Coachers are bred is very well defined.

The Percheron is known throughout the whole of this country. In color he is usually gray or black. At the present time the black probably predominates. In height he is ordinarily about sixteen hands. In weight from sixteen to twenty-two hundred pounds, depending to a very great extent on the amount of flesh he carries. These horses have been bred in the same district, the son breeding and following in the footsteps of the father, from time immemorial. They have been imported in large numbers to America, in fact such a drain has been made upon the country that a great many of the inferior

specimens have been brought here, yet, nothwithstanding this fact, they have crossed with the native mares in America and produced animals vastly superior in conformation, in endurance, in elegance and in activity to those that the very best stallions of any other draft breed have ever been able to produce. At all the greatest shows of draft work horses in this country they have never been defeated by the produce of any other draft breed crossed with the mares of this country. At the recent Inter-National in Chicago, these grade Percherons defeated the very best pure bred animals of the other draft breeds that unlimited expenditures of money could find in Europe.

The economical farmers of this country who wish to produce on their farms the greatest quantity of products with the least cost, and those are the men who are always successful, will find that grade Percherons will do more work on their farms for a less expenditure in feed than will any other breed of horses that can be found. I wish to urge this fact especially upon your attention. I do not think that there is any possible way of being of more benefit to a community than to be instrumental in procuring animals of this breed to work on your farms, and thereby not only increase the production, but diminish the cost as well. At this time, when so many of the young men are leaving the farms for the cities, it is essential in order to induce the young man to stay on the farm that he have some interest that will keep him there; good horses will produce more good effect in this line than will other breeds of live stock.

There is also another side, which, while it should not, yet it will probably interest you more, that is the side which touches the pocket-book. There is no place in which the products of the farm can be placed more profitably than in good horses. There is always a demand for the best, and the best always brings high prices. Only recently in New York a large firm paid $45,000 for one-hundred-grade Percherons. These horses were all bred in the middle west, and the men who bred them certainly never made more money out of the corn and oats they fed to any animals than they did from the oats and corn these horses ate, and while they were eating it they were enabled, after the age of two years, to always earn enough to much more than pay for the feed they consumed.

There is another type of horse which is very profitable for the farmer to raise. It not only gives him great pleasure, but great profit as well. This is the highest class carriage horse. His height is about sixteen hands. His weight about twelve hundred pounds, and with this he must possess a beautiful conformation as well as good action.

The better the action the higher price he will bring. The production of this class of horses can be arrived at in no better and quicker way than by crossing the ordinary light mares of this country—the trotting mares or saddle mares—with a French Coach stallion. The country about Marion, Iowa, which has produced more high-class carriage horses than any other section of the United States, has used more French Coach stallions in their production than has any other section.

The French Coach horse has been developed to its present state of perfection by the French government in order to produce a horse of more courage, more endurance and better conformation than any other breed of horses in the world. That they have succeeded in this effort is proven by the fact that all other countries in Europe come to France to purchase French Coach stallions for the improvement of their herds of carriage horses.

There never was a better time to begin breeding and raising better horses than the present moment. We now have an export trade firmly established for our grade Percherons and Coachers, so that the time will come when the American farmer can not sell good ones for Europe at a profit better than he can receive for any other breeds of live stock.

THE PACKERS AND THE RAILROADS—THE TWIN SERPENTS, HOW TO BRUISE THEIR HEADS.

(M. H. Pemberton, Centralia, Mo.)

Sometimes I talk for fun—sometimes for money—but to-night I am talking for the farmer. I am one of the horny hands of the sons of toil—without the horny hands. But I know the farmer's troubles, and I am here to tell some of them.

Until I began farming I never knew that there were so many hogs in the world. I find the woods is full of them, and they all need ringing. A hog that don't need ringing is down in the back, or dead. Another thing about a hog. I have never gone out to feed my hogs yet and had one of them come up and wait until any of the rest got there. Not only does he not wait, but he grabs the corn and runs off with it. And the hog that has been lying around the corn-crib or drinking slop from the kitchen for a year or two is generally the biggest hog.

The majority of mankind are not related to hogs, but some are,

and these you must ring. They are in the farmer's corn-crib and eating up his substance. But my subject is not hogs, but serpents, the twin serpents, the Packers and the Railroads, and how to bruise their heads. Every monopoly and trust affects the farmer, as well as every other man not on the inside, and profiting by it, but the Beef Trust and the Railroad monopoly are the two serpents whose slimy coils are around the farmer. To shake them off, to cut them loose, to bruise their heads, is the thought of the farmer. The farmer's heel is just itching to get on them. And if I mistake not the signs of the times, we are going to see the heel of Uncle Sam come down, and woe be unto all that are beneath it.

In the vatican in Rome, of which you have heard the college orator speak, is a celebrated work of art, a marble sculpture representing Laocoon and his two boys being strangled by snakes. The faces of the father and sons express the most intense agony and pain as they struggle in the coils of the venomous serpents. Laocoon was a very strong man, but the serpents were smothering him. As I stood before this group of father and children struggling in the coils of those moccasin-headed snakes I thought, here is the American farmer, and that big snake there drinking blood from his side is the Beef Trust, and that other big snake wrapped about his arms to keep him from striking is his twin brother, the Railroad. And those little snakes—what did they represent? I couldn't tell, unless they were the crooked betrayers of the people, who had crawled into the halls of the Legislature, and were simply there to catch the overflow.

I have chosen this subject because the Packers and the Railroads are the two thorns now in the farmer's flesh, and because I believe that the farmer will have to pick his own splinters out if he ever gets them out. The farmer in the past has been too easy—too good—too slow. He toiled all day and slept all night. He watched his own stuff, and forgot to watch the other fellow. He looked down and not up. The result is that the corporations have a patent on all his rights. But now the farmer is awake and wants his six-bits back. They were given or sold away by law, and by law they will have to return.

For instance—I don't like to deal in generalities—let us get down to particulars. The first time I went to market with my stock I didn't like the way things were done there. The charges looked too high, and there seemed to be too many middle men standing around. The train got in a day late and we had to lay over. Yardage, feed and commission seemed out of proportion to the price of stuff, and I said, is this the way Missouri runs her stockyards? I was thinking

of "poor old Missouri" leaving her lambs to be shorn and led up to the slaughter without a murmur, when I was informed that the State of Missouri had nothing to do with it. Well, I said, is this the best the city of St. Louis can do? I was informed that the city of St. Louis had nothing to do with it. Well, said I, what is this thing here, anyway—who owns this building and these yards? A Stock Yards Company of gentlemen, who have little privileges in their pockets from the great State of Missouri to run them for their own benefit. The farmer holds his hands, and the Stock Yards Company goes down one pocket and the commission firms down the other, and if he gets back home with his breeches he is doing well. He had sense enough to raise or buy his stuff, and feed it, and ship it to market, but he hasn't enough to sell it or buy more, and he has to have help to get his pass back home.

I say to you that the great State of Missouri ought to own her own stockyards in the city of St. Louis, Kansas City and St. Joseph, and all the other centers of population in the State, and they ought to be run at a minimum cost for the benefit of the farmers, who produce and ship the stock to market. Not only the State own the yards, but the farmer should be allowed to sell his own stuff and buy it in the open market. As it is, a killer in the city cannot or will not buy from a farmer in the country without allowing a fee to some pet commission firm. If one packing house buyer gets into the pen and bids on stuff, and wants his bid to be final, he will not be molested by his competitiors—his rival—his pal. They remind me of the way tramps do business. When meat is to be had they chalk the gate, and the next day his brother tramp stops for feed at the same place.

I am not sure but that the State should maintain a slaughter-house, where the farmer can have stock killed at so much per hundred, which would open the market to retail butchers, who could buy it on the hook. It is done in other countries, and we certainly have as much sense as sleepy Europe. But the Beef Trust has us—they fix the price, and they make the market. Why have hogs been worth about four cents at home all fall, with corn at 40 to 50 cents? Because the packers are now packing their pork. And why will they sell higher in a very few weeks? Because the packers will have pork to sell. Like begets like. They handle the hogs so much they become like them. And why do the farmers and stockmen permit these conditions to exist? Because they have not howled out loud enough against them. These men we send to make our laws—they will listen to us, when they are sure the howl means business. At last a President of the United States has heard the farmer's yell, and he has answered.

Rah! Rah! Rah! oh, yes sir—we'll look into the Beef Trust—we'll crack it to the railroads, and we'll do any other old thing that the people demand. Publicity is the doctrine. It will pull bad things down, and it will help good things up. My advice to farmers is, when you see a great evil, something that's robbing you, just begin to yell, and get your neighbors to yell, and get everybody to yell, and don't stop yelling until Uncle Sam asks, "what's the matter?" Then tell him the trouble, and tell him to move double quick.

According to my doctrine, the states ought to take over the stock-yards, and manage and control them in the interest of the people as a whole. Let laws be enacted and enforced which will give absolute protection to the buyers and sellers in that market. And let the people in the towns and the country kill their own stock as far as possible. I was glad when I learned that right here in Columbia some enterprising men were putting in an independent packing plant. Now you watch the packers run meat into this town at less than cost and try to crush out this enterprise. If I were running a butcher-shop in this town and the packers offered me meat on the hook at the price of beef on the hoof, I would tell them to go to—wherever my religion would allow me to say.

The packers violate the law every day. They agree daily on the price they will pay and the price at which they will sell. Supply and demand operate, of course, but the packers can push the price up or down just as they wish. Now this is no theory, and there is no guessing about it. I have seen them do it, and any other man who has bought and sold around where they do business has seen it. But what are we going to do about it? I'm too young to announce any radical remedies, but I will venture this much. If the farmer in particular and the public in general will inform themselves of the live stock situation, and the dead stock situation, there will be something doing. But the public—oh! The public—they step over evils six feet high and never see anything until it bumps them in the head. Every man is trying to feather his own nest, with mighty little thought of the public good. Men become satisfied in their spheres of activity, forgetting that there are buzzards above them just waiting for a chance at their carcass. When we see the black shadows about us it is a good time to stop and take a shot at the beasts above. The man who keeps his nose constantly to the grindstone may sharpen his nose, but he will end up with a disfigured face. They used to make a heap of fun of the horse-back farmer, but I find that I can see more upon the top of a horse than I can on the ground. It's a good

idea to get upon the fence occasionally and think a thought or two. The farmer's job is not done when he has produced something, the pie has to be distributed—passed around, and he has to see to it that too many fingers don't get in on it.

A great day is ahead for the farmer. It used to be that the leading citizen was a man most ignorant of agriculture. Today a man who knows not agriculture is an ignoramus, fit only to send to make our laws. And they used to think the farmer had hayseed in his hair, and didn't know how to cut his whiskers, and wore one suspender by preference. That old farmer is dead, and they are growing selected seed corn over his grave. The high-class farm papers, the newspapers, the telephones, and rural delivery killed him. The modern farmer is on to his job, and what he does not know he is learning, and the main thing he is learning is to take care of himself, and look after his interests. You need not be surprised when he gets after the Beef Trust, and makes it hot for the railroads. It's a part of his business. The people are coming into their own, and are learning that legislators are their hired men, and that the machinery of the law was meant to use.

The packers are a great people. They have helped to make the country what it is. They built the plants that slaughter thousands of animals that it takes daily to feed the multitudes, but we have a right that they confine their slaughtering to the animals, and let the farmer live. We must look after the goose that lays the golden egg. When the packers go beyond the purpose of their existence and combine to fix prices and violate the law, the people have a right, and ought to break up their illegal combinations.

I hope I have not stated the case unfairly against the packers—but if the Beef Trust is not a serpent whose head needs bruising, then I am no judge of snakes. I will confess that I am a little bit sore on packers. I have been feeding four-cent hogs on fifty-cent corn, when I know and you know that the packers have arbitrarily held the price there until they could load up their coolers to unload on the public later at an exorbitant price and a tremendous profit to themselves. And if that won't put a farmer on the war path, what will? I wish I was a great big lawyer—big enough to be Attorney-General, I would take a few rough-riding lessons, and tell you farmers to get up behind, and we would charge the Beef Trust before breakfast. I was a lawyer once—the kind you read about—who got a diploma, but never got a case. But I'm very well satisfied with my position—there is a better opening in Missouri for a live, kicking farmer than for a Democratic candidate for office.

GROUP OF ABERDEEN ANGUS.

First prize Missouri Young Herd, St. Louis World's Fair. Also prize winners at the American Royal. Owned and exhibited by W. J. Turpin, Carrollton, Missouri.

So much for the packer. Now this Beef Trust has a brother, a twin brother, the Railroad Monopoly. Regulation of the railroads is the question of the hour. In the early days the railroads were built by everybody. The capital came from many sources, and competition was sharp. The people suffered no evil. But times have changed. We have had organization and combination until half a dozen families own the railroads of America. Competition is destroyed. Rates are fixed. Discriminations abound. Rebates are behind the scenes. The people's rights are ignored, and the farmer's only protection is to look out for the cars.

At the outset I want to say that on this railroad question I'm a "gover'menter." I want to see the people in control of every public highway from a dog path up to the Atlantic. Because I believe that when everything belongs to the people the people ought to have possession of it. My politics is public ownership of all public utilities. I want to see every city own and operate street railways, her water works and lights. I want to see the great American continent with a net work of railroads owned and operated by the national government. I want to see ships and steamers, floated by Uncle Sam, and waving the stars and stripes upon every stream that touches America. Public highways and transportation belong to all the people and to unborn generations, and should never be given or sold away to private individuals. You say that we have the right to regulate and control transportation lines. Yes, but history has proven that we cannot do it. They have debauched our public servants with dirty money, and obtained privileges and franchises for nothing that were worth millions, and they have maintained a standing army of secret service men to watch the halls of Legislature and keep the people out; and I am sorry to say that in many cases some of the secret service men have gotten on the inside. The people furnish them a free seat, cut their whiskers, shine their boots and furnish them a free bath. Now I am not kicking on the bath—no doubt they need it—but the people need the seat to put a man in. How many Senators in the United States do you suppose there are who are more watchful of the interests of certain corporations than they are of the people's welfare? More than one, I assure you. It is a hard thing to say, but wrongs are never righted by silence. Watch the railroad legislation now in process at Washington, and if no Senator raises his hand against the people's interest, I will retract. As long as United States Senators are chosen by State Legislatures we may expect railroads and corporations to control legislation. The people in every county and in every State in

the Union ought to exact a pledge from every candidate for the Legislature, that before he casts his vote for a United States Senator, that Senator should pledge himself to work for and vote for the election of United States Senators by direct vote of the people. Until we obtain possession of our law-making bodies, we cannot expect to control and regulate the railroads, the corporations and the trusts, which are now preying upon the public. But, with public ownership of our law-making bodies, we could obtain control of public utilities that are now private monopolies. With public ownership of the railroads there would follow a parcels post system which would relieve the people from the merciless extortion of the greatest highway robbers of modern times, the express companies. The telegraph service would be attached to every postoffice, where it belongs; and the grip of many other monopolies would be broken. Now someone will accuse me of talking politics—I am not talking politics—I am talking self-preservation. If President Roosevelt were nominated four years hence on a Republican platform declaring for the public ownership of railroads, the telegraph, a parcel post system, and the election of United States Senators by direct vote of the people, I would vote for him. And if Wm. J. Bryan were nominated on such a platform by the Democrats I would vote for him. And if I were nominated for the Legislature on such a platform two years hence, I would vote for myself. I lost my last election by not voting for myself, and I will never do it again.

People think of public ownership of public utilities as a strange doctrine. They forget that the government manages the postoffice, the most gigantic business, the most intricate, and with more details than any other business ever inaugurated by man. They also forget that more miles of railroad are owned and operated by the government than by corporations. I go on the principle that if my neighbor does a thing a certain way and it is a big success, that it will pay me to investigate his business and do likewise. When other nations can give their people cheap passenger rates and freight rates, and make their railroads revenue producers, it is certainly worth our while to consider who has the better way. It is sometimes said that public ownership of railroads would give too much chance for corruption. Wouldn't it be better to have corrupt officials occasionally in the public service, where we would get at them and kick them out, than to have them continually in the private concerns where we can't touch them with a forty-foot pole? I firmly believe that the final victory of the people over monopolies is to be had only in public ownership of public utilities. It is coming, but it is not here yet, and until it

comes the farmer and stockman must get the best relief possible under the present system. The question is forever settled that a railroad is a public highway, and as such is subject to control and regulation. We may not be able to reach their secret coffers and prevent rebates and discriminations, but many evils and extortions can be corrected if we will use the machinery and powers that we have. And the farmer's main power is kicking. Again we must get up steam by the farmer's yell, and while the President is advocating federal regulation, and an increase of power of the Inter-State Commerce Commission, we ought to begin to yell, and yell so loud that our representatives at Washington will hear the echo, and will be afraid to come home until they do something to relieve the people from the greed and grasp of the railroads.

SHOULD WE FEED THE CROPS ON OUR FARMS OR SELL THEM?

(D. T. Mitchell, Woodlandville.)

Or in other words, is it best for a farmer to feed his crop to his stock on the farm—cattle, hogs or sheep—or sell the grain product? There are only two phases that I will attempt to bring out of this question in the discussion of this subject. The farmer will necessarily be influenced in answering this question by his view-point. If he regards as the foremost of all important questions, the piling up of dollars—if he thinks more of a plethoric bank account than he does of a bright son or a sweet daughter—or if he thinks it is no rebellion against nature to commence life with a vigorous, productive soil and leave it worn out, an ugly waste place, fit only to mar the beauty of nature and require of the next occupant an accession of more wealth than he has put to his own account to restore its fertility, then he will pursue that course that will bring to his possession the greatest number of dollars. In doing this I think he commits a sin, in an agricultural sense, unpardonable. I do not believe that any man has a moral right to take the resources that the Divine Creator has put into our hands and waste or abuse them, and the selling of crops from the land must necessarily entail this condition. It is a sin against the resources that have been committed to his care for a wise purpose.

We have all heard the remark—I have at least in my own community: "Well, this land will last and continue to produce, I suppose, as long as I live or I shall want it," carrying out the idea that the Al-

mighty had no other object in view in the creation of that land than his occupancy or its use during his life time. Certainly we ought to have enough patriotism and love for our fellow men to not export that fertility which has been so abundantly given to our possession. If we continue to drain our soils by the carting off of our products without reimbursing them, we must necessarily deplete our soils.

Another reason: We are better prepared to meet the question of transportation in a concentrated form by feeding our products on the farm than by carting it and selling it in a crop form. I use to live in the Rocky Mountains. The concentration of the ores was secured by a succession of innumerable mines, they were concentrating mines by which they reduced the weight to such an extent that the ores could be sent to the smelting plants, and otherwise they could not have transported them at all. This same process will apply when farmers understand that a bushel of corn weighing 70 pounds can be put into five pounds of beef, and so on through the entire list, including the greatest concentration, the dairy product, and they will see the economical aspect of this question in the matter of shipment of our stock as compared with our grain products.

Therefore, for two reasons, I think we should feed the products of the farm on the farm rather than to sell them in their crop condition, from the fact that we maintain the fertility of our soil thereby and can concentrate our product so that we are not so heavily taxed in getting it to the market. These are the two ideas I advance, and thank you for your attention.

NEW METHODS.

(Hon. M. V. Carroll, Sedalia, Mo.)

When I begun to consider the subject assigned me as a preliminary to the preparation of this paper, I was undecided whether I should feel complimented over the fact that its boundaries are as limitless as the ocean, or regret that the starting and stopping points were not more clearly defined. I have heard that in political meetings, where the managers have to deal with a verbose, long-winded individual, they aim to make him chairman and thus curb his talking propensity. Were this theory applied I should feel complimented that the program committee had sufficient confidence in my bent for concentration to assign me a subject practically devoid of limitations.

The sphere of operations covered by the two organizations repre-

sented in this meeting—the live stock breeders and corn growers—includes the major portion of the whole field of Agriculture. It has been said that there is nothing new, that the discoveries of today are the forgotten knowledge of former times. Were this literally true the task assigned me—that of indicating new methods for the application of farmers and stockmen—would be an impossible one. In the presence of an audience such as I am facing, composed as it is of learned college professors, bright and quick-witted students and successful farmers and stockmen who possess the cumulative knowledge that comes from long years of experience and research, it would be presumptuous for me to attempt to specify any new or unheard of methods. But we are all more or less prone to forgetfulness, hence what I may say will be to you as reminders rather than innovations.

REAPING WITHOUT SOWING.

Knowledge is of no practical value unless applied. There was a time in this country when the custom of sneering at what was designated as "book farmin'" was widespread and popular and its votaries delighted to belittle the agricultural press and every farmer who sought to gain information thereby about his calling. Now the intelligent, progressive farmer could not get along without these harbingers of progress. Through their aid he may be said to reap without sowing—he garners the net results of the experience of thousands of other farmers and skillful investigators without himself having to undergo costly and vexing experiments. The disposition to realize on this species of "reaping" may be called a "new method" for the reason that not more than one farmer in ten takes and reads agricultural papers. May be this statement appears overdrawn? Mentally survey your own community: What per cent of those of your acquaintance can prove by their system of farming that they read agricultural papers? In our editorial rooms we receive a large number of agricultural exchanges, coming from all parts of America—without a single exception each and every one of them strenuously and persistently advocate the sheltering and proper care of farm implements. Recently, while making a ten-mile drive in a certain Southwest Missouri county—one of the best, too, in the State—I noted the binders, mowers, plows, cultivators and other implements left in fence corners and other unsheltered places, and calculated their aggregate worth at conservative values—there were over $2,000 worth left out doors, to rust and rot away. Possibly some of you pure bred stock breeders would say that the owners of those implements are "scrub" farmers. Maybe they are—but the biggest display of unsheltered im-

plements I saw during that drive was on the farm of a pure bred stock breeder. However, I may say, parenthetically, that I don't think he is in attendance at this meeting.

SOILS AND SEEDS.

In my boyhood days, back in the Buckeye state, I heard old farmers boast that a certain field had been cropped continuously in corn for *forty years*, but they would mournfully admit that their yield was "sorter nubbiny, kinder run out." The "new methods" of modern agriculture teach that such a practice robs and impoverishes the soil; that unless we give back to it in some form an equivalent for the plant food taken from it we lessen its productive capacity—also, that if properly managed, the degree of soil fertility may not only be fully maintained while producing a maximum yield but may actually be increased. The aforesaid "double decade" corn grower, uninformed of the facts that like produces like and that cereals allowed to follow their natural inclinations inevitably tend to deterioration rather than improvement, selected his seed corn from his crib of nubbins—the variegated result was designated "kaliker corn" and was just a little bit meaner than the parent stock You expert corn growers now talk about *breeding* corn, meaning thereby improving it by the careful selection of foundation stock (the seed), mating it with the requisite conditions of soil fertility and tilth and the application of known facts relative to pollination by means of which you maintain its pure bred standard and reasonably expect the offspring will be just a little better than the parent stock in both quality and yield, and that the net results will more than compensate for the cost of their achievement. This is a "new method" of corn growing and it will apply with equal force to every other crop grown on the farm.

NEW LIVE STOCK METHODS.

When we contemplate the apparently well authenticated statement that less than two per cent of the live stock of the United States is pure bred, the remainder being grades and scrubs, the conclusion must obtrude itself that most of the hosts were absent from home when Mr. and Mrs. New Methods made their round of calls. The old method was to breed and continue to breed scrubs; the new method would banish the scrubs and supply their places with pure bred live stock, all kinds. Many, many years of patient, persistent effort, representing the natural lifetime of two generations, supplemented by the expenditure of millions of dollars, have been devoted to the improvement of live stock in this country, and yet we face the humiliating fact that but *one-fiftieth* of the

task of scrub annihilation is accomplished. What's the matter? Why have we not made greater progress?

A famous American general is credited with the declaration relative to one of his campaigns that he would "fight it out on that line if it took all summer." We have already devoted almost a century of summers to our plan of attack on scrubs and have only made a two per cent start. Evidently our plan of campaign is defective. Maybe our supposed new method is really an old, antiquated one, else why such slow progress? This paper is already becoming lengthy and older and wiser heads than mine have wrestled with this problem. I frankly confess my inability to suggest a new method that would promise to speedily and effectually surmount all of the old obstacles to universal live stock purification. I will, however, present a few suggestions born of close observation.

"SCRUB" PURE BRED BREEDERS.

That quaint old Englishman, Ben Johnson, said that "clothes make the man." We know that appearances always count for more than their par value, either for or against a man. I said a while ago that the largest display of unsheltered implements I saw in a ten-mile drive, was on the farm of a pure bred breeder. That man was related to the "Bill Tumbledown" family and is a positive detriment to the crusade against scrubs. Why? Because the average farmer who has been breeding scrubs has come unconsciously to the belief that the owner of pure bred stock—"thoroughbreds" he calls them—is a *pure bred farmer*, that all of his methods and operations should harmonize with his pretensions about his stock; when he finds that the animals with high-sounding pedigrees are so unpreposessing in appearance by reason of indifferent, "*scrub*" care as to look no better than his own mongrels, and that the surroundings of rickety, ragged fences, neglected buildings, foul and muddy lots; thickets of cockleburrs and the whole premises resembling the typical "widder woman's place," his ardor to replace his scrubs with pure breds is very apt to cool off—his respect for pure bred stock and pure bred breeders undergoes a shrinkage and if he does buy some of those unfortunate animals he is apt to handle them by scrub methods, because he is unable to see wherein Bill Tumbledown's methods are any better than his own, and disappointment is bound to result. In the language of the street, Bill is a misfit. He is a scrub breeder of pure bred stock, a mixture of old and new methods in which the old predominates and his influence is a wet blanket on the great industry with which he has aligned himself. The multiplicity of members of the Tumbledown family is the greatest of all hindrances to the banishment of

scrubs. The new methods here applicable would be to furnish pure bred care and environment to pure bred stock—then the moral force of the combination would most certainly impress their great superiority over scrubs.

INFLUENCE OF THE SHOW RING.

Public sales of pure bred stock have become a popular means of selling the surplus and could be made to exercise a highly beneficent influence. Unfortunately, however, they are often detrimental to the pure bred cause—again too many Tumbledowns. Scalawag and tail-ender stock, top-heavy with pedigree but devoid of even ordinary individual merit, that should have gone to the feed lot is presented as breeding stock. Here again the votary of scrubs who has come as a spectator draws invidious comparisons and gives audible utterances to his thoughts: "Them peddygreed critters ain't a bit better than my scrubs." The new method would be to not only rigidly exclude from the public sale ring all but really meritorious stock but to deny it registration as well. The record association should exercise a more rigid censorship over the quality of breeding stock for which they assume to stand sponsor.

My subject leads on and on, but this paper is already too long. Let us reform our plan of campaign, retrace our steps and start again by regenerating the scrub breeders—the men who assume to breed pure bred stock, while practicing *scrub* methods, then scrub live stock will lessen rapidly.

WHAT HAS THE WORLD'S FAIR ACCOMPLISHED FOR MISSOURI?

(Hon. Mat. W. Hall, Marshall.)

Mr. Chairman, Ladies and Gentlemen:

I believe the subject assigned to me is "What has the World's Fair Accomplished for Missouri?" I want to say that I am glad to be in Columbia tonight and I am glad to undertake to make some sort of address in the University of the State of Missouri on this particular subject. I am glad for the reasons that two of your citizens were very prominently connected with the World's Fair.

As to what this World's Fair has accomplished for Missouri, no man at this time is able to know. Since I have been assigned this question, I have asked a great many people "What particular thing, above all others, in your judgment, has the World's Fair done for Missouri?"

Jackson Chief, 4759, the never beaten Chester-White of the world, winning the grand championship prize at the World's Fair, 1904, and $758 cash prizes. Bred and owned by Judge L. L. Frost, Mirabile, Missouri.

They have given me all sorts of answers. Some of them have said: "Why, it has advertised Missouri to the East, which never appreciated it before." Others have said that "it has advertised Missouri, not only to the east, but to the civilized world, as she has never been advertised before." These things are good, I will admit, but there are other great things that this Fair has done for Missouri.

This Fair has done somethings, some things it has not done. One thing it has done: this Fair enabled Missouri to discover your distinguished citizen, Walter Williams, and in spite of his extreme modesty, has forced him to acknowledge the fact that he is the author of the best history of Missouri that has ever been written up to date, and that history, to-night, is not only scattered over every state in this glorious Union, but it is being read by the people of every civilized country on earth. But one thing this Fair has not accomplished, fellow citizens, and I rejoice in the fact that it has not, it has not made any change in the countenance of the man who conducts the train that runs from here out to the Wabash main line. From the cap that sits on his head to the shoes that are on his feet, there is a look and an appearance of satisfaction and contentment. I think he is the best satisfied—the best contented man with the position he holds that I have ever seen in my life. He is cordial to everybody. He assists the ladies on and off the train and he is as well satisfied as it is necessary for any man in this world to be. And what a great thing, fellow citizens, what a *great thing,* it is to be satisfied. And the greatest thing, in my judgment that this World's Fair has done for Missouri is that it has satisfied Missourians with this, our own country. It has done more to make Missourians contented with Missouri than all other agencies put together in the last forty years.

I think I have a right to speak on this question, for the reason that I journeyed over the western half of Missouri and Col. Waters down there journeyed over the eastern half of Missouri, organizing the several counties in this State, looking to the getting out of the displays from these counties, and I say to you that I never understood, and I found the people in these counties did not understand any better than I did, the wonderful, *wonderful* possibilities of this great State of ours. I want to say to you that I found counties where men had been living for years and years, surrounded with peace and plenty and living in comfort—had simply stayed at home. They had looked on the same ridges, they had looked on the same trees and the same houses and the same people until things had become common to them. I have known numbers of these cases where these men in an unguarded moment priced their farms to some passerby and sold out at what they considered fabulous prices,

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thinking they would go to another state and better their condition. I have known Missourians to leave our State in the last four years, and after they had looked around for a few weeks, go back to their original vine and shade tree and beg the man that had bought their farms to let them buy them back at an increased price, and when they were refused, sat down and wept. I thank God, as a Missourian, for the World's Fair, if it has done nothing else than to satisfy our own people with our own country and induced them to hold on to it. It has enabled Missouri to make the greatest display of her mineral resources that the world has ever seen. The people of our own State now know more about the possibilities of the mineral output in Missouri than they have heretofore known, even of the Agricultural output in this State. In the Educational Department, in the Forest, Fisheries and Game, as in all the rest of the departments, no man ever saw from any State or country such a display as was made by Missouri. It enabled the farmers of Missouri to make the greatest Agricultural display that was ever seen or known at any of the great fairs of the world. And I want to say to you that when the Committee on Awards had completed their labors in the Agricultural building they came to me and said: "We have done for Missouri all that it is possible for us to do under the rules of this Exposition, but we realize that we have not done half enough." *Half enough.* "Because," they said, "Missouri stands here absolutely in a class by herself; so much so that we, the members of the Group Jury are going to the Superior Jury and ask them to create a special place that Missouri may have some special recognition." I want to say that while the farmers are responsible for this magnificent display—because we never could have made it in the world if the farmers of Missouri had not responded to our call—I want to say that they were as much surprised when they came down there and saw what they had done as anybody else that visited that Exposition. We had on display about three thousand bushels of corn, the equal of which was never collected before under one roof.

Another thing that the World's Fair has enabled Missouri to do—some of that corn today is in every part of the civilized world. Missouri has corn today growing in South Africa. Early last spring there was a South African Boer farmer who came over to St. Louis to look after improved farm machinery. He came to our space and he greatly admired our corn display. Down there they call it "the mealy cob." He said, "It cost England millions of dollars. Our men would have it in their haversacks and when they stopped at night they would grind it up with their little mills and we would make our gruel with it and would

cook our meat in it. There is nothing in it but what would make us strong and able to fight, and," he said, "While I don't blame you, still it is a fact that if the United States had not furnished England so much beef and so many mules, we would have whipped her in spite of fate." That South African farmer said further: "The war has destroyed our horses. The English put explosives under our farm implements and blew them to pieces, but the great God that rules over the destinies of our people has given us plenty of coal in the bowels of the earth and we are getting it out. I have purchased two steam gang plows and I am going to ship them to South Africa and with these I am going to plow my land by steam." He owned six thousand acres of this African prairie. I said: "My friend—because I am your friend, as are all Missourians—when you get ready to ship your implements back to South Africa, come to the Missouri space. I want to take out some of the best seed corn in this space and I want you to carry it back to South Africa and plant it in the name of Missouri." He came back and I picked out two barrels of the best corn I could find in the space and he took it back with him. Their season is the reverse of ours, and it was planted the first of September and is growing today. That is another thing that the World's Fair has enabled Missouri to do. It has not only enabled her to show the wonderful products of this wonderful State of ours, but it has also enabled her to show that she is a friend of oppressed and down-trodden humanity wherever that humanity exists.

This subject, ladies and gentlemen, is a pleasant one to me. You will remember that when the proposition of the World's Fair was first suggested, I favored that proposition. The people of Missouri responded to the call of the Missouri Legislature and generously appropriated a million dollars for Missouri to participate in that great enterprise. The Missouri Commission have up-to-date—(they have not finished)—spent about eight hundred thousand dollars of that million dollar appropriation, and I want to say as a native born Missourian, that, to my mind, it is the best money that the State has ever expended. Do you believe me when I tell you that people have come to the Missouri space—(and you will pardon me, ladies and gentlemen, for speaking of the Agricultural space, for the reason that that is the only space that I had any thing to do with, and the people that came to that space are the only ones that I met. I do not want anybody to think that I want to boost the Agricultural display over the other Missouri displays, because it was the universal verdict of every lady and gentleman that I conversed with at the Exposition that—go where you would from the State Building to any of her exhibits—that Missouri stood head and shoulders, in

every instance, over every other state, territory or nation that exhibited there)—during spring, summer and fall, people would come to our space in the Agricultural building from the eastern part of this country and some of them were so much astonished as to be almost angry, and they would exclaim, "Why, how does this come? What does this mean? We have never regarded Missouri as a great Agricultural country." One man said to me: "This will do a great thing for Missouri. Why nobody thinks of Missouri like this back in our country. We have always regarded Missouri as a border state. We really back in our country when I first talked about coming out to the World's Fair"—now this sounds fishy, but it happened—"when I first talked about coming to the World's Fair, my people told me: 'You had better not go down there to Missouri. Some of those Missourians will kill you before you ever get back,' and I confess to you that I was silly enough to have fears on that subject. But I have come and seen your display and I see as fine men and women here as I see in any part of the world; and this World's Fair will be a great advertisement for Missouri, will cause a great flood of immigration to come into Missouri." I said: "Well, Missouri is here, they can come if they want to. But," I said, "let me tell you something about the characteristics of a Missourian. You will never find one of them that will beg you to come and settle among them. You are welcome if you come and you are welcome to stay if you want to, and if you don't want to stay, you are just as welcome to go away as you were to come." He said: "Why are they that kind of people?" I replied, "I can explain it to you." "Missourians spring from a race of pioneers that came over into this country in an early day, married, as my father and mother did, as mere girls and boys, and very frequently journeyed over into the wilderness here on horseback bringing their worldly possessions along with them. They located on a good strip of timber, by a good spring, built them a cabin and began life and lived happy and contented and raised a large family. They have always known that they had a good thing, they have always been satisfied with their surroundings and you never see one of them on a housetop, blowing a horn to attract somebody's attention to get him to come and settle here by the side of them; but still, if he comes, he is welcome." I further said: "These people that you find in Missouri come from such stock as that, and while we have the best people that the sun shines on, while we have the most hospitable people in the world, they won't beg you to abide with them, but you are welcome if you want to come. And I say to you now, as a Missourian, if you want to change your home, I tell you to come to Missouri and

in any part of this great State you will find such a civilization as I have described to you."

Let me tell you, fellow citizens, a little story of pioneer life I got hold of in my travels. I was down in Rolla and I was talking about Missouri, as was my business at that time, and when I finished a tall, grey-whiskered man laid his hand in mine and said "I like to hear a man talk about Missouri as you have talked about it." I thanked him, of course, and we drifted to one side and sat down and he told me a story, and I am going to trespass on your patience to tell it to you. He said: "Way back in the early days of Missouri two brothers journeyed over into this State and settled near the Missouri river above St. Louis. The older brother was to take care of the farm while the younger brother was to look after the housekeeping, cooking, etc. They lived that way for several years and did fairly well, but one day the younger brother who had had a piece of meat to burn while cooking—I suppose a stick of wood had burned in two, turned the kettle over and poured the contents on the ground—got up a demurrer. He said to his brother: 'We have been living along this way for several years, but this is not the way to live. One of us must get married.' The other brother said: 'All right. You are the youngest. Go and hunt you a wife. I realize that we can live better and be better men with a housekeeper than we are now.' The younger one said: 'No, you are the oldest. It is your duty to get married first.' So they discussed it until Saturday morning. They knew where there was a pioneer family living across the country containing a number of girls. So on Saturday morning the older brother started, traveling by the points of the compass, because there was no road in those days. And when he got over to the house, first his horse was put up, then he must come in and have some supper. After supper he and the father of the family walked into an adjoining room and sat down while the wife and daughters were doing the dishes, etc., and he said to the father: 'I have come over here to see if you had any objection to my marrying your daughter.' The old gentleman said—'Well, I don't know. What does the girl think about it?' 'Oh,' the young fellow answered, 'I am not acquainted with your girls at all. I felt that my first duty was to talk to you on that subject.' The father answered: 'Well, if my daughter is willing, I certainly have no objections,' and he turned and spoke to his wife through the open door, and said: 'Send Mary in here.' Mary came in and he gave her a formal introduction to the man. He said: 'Mary, here is a man come up here and wants to marry you. What do you think about it?' 'I have not thought about it at all.' 'Well, you think about it till tomorrow morning and after breakfast you can

give your answer.' The dishes were done up. The family sat and conversed until retiring time and the next morning Mary was called on for her reply. She said she was willing to marry the man. The father was a justice of the peace, and he said: 'If you want to get married, I will marry you this morning.' The young man said: 'I don't want to marry so soon as that. I want to go home and tell my brother and we want to add what conveniences we can to the premises, in our crude way, and if agreeable to everybody, I will go home and come back in two weeks and be married then.' It was agreed, he went home; he and his brother did as he said and at the end of the two weeks he came back and the next morning they were married. He got on his horse and rode to the stile blocks, his girl wife leaped on behind him and their bridal tour was forty miles through the wilderness back to his home. The sequel to that story is they lived a long, happy and prosperous life, raising a large family and today as a result of that union, their grandson is a professor in the School of Mines at Rolla, Missouri, Professor Wilkerson." This marriage of real pioneer life seems a very crude marriage to us, but, ladies and gentlemen, fellow citizens and Missourians, I am going to take the stand on this platform in the year 1905, and say that there was more sanctity, more manhood and womanhood and more real marriage in that marriage than there is in half the marriages of today.

Now, ladies and gentlemen, I have talked to you long enough. I do not know just what the future of Missouri will be, but my ideal is a very high one now. I do not know what my own future may be, nor do I know that I am specially concerned on that point, but I know that I was born in Missouri, the mother and father who gave me birth are buried in Missouri and when life's journey is over with me, there is one wish above all others that I now make, and that is, that I sleep in her bosom and mingle my ashes with her dust.

I thank you.

THE LOUISIANA PURCHASE EXPOSITION.

HELD IN ST. LOUIS, 1904.

SOME FACTS ABOUT THE WORLD'S GREATEST EXPOSITION—MISSOURI IN COMPARISON.

AGRICULTURE.

Agriculture at the Exposition.—If there was one particular in which the Louisiana Purchase Exposition excelled all other expositions it was in the beauty and magnitude of its agricultural display. Agriculture is the foundation of all arts, sciences and industries. The only human occupation, which from its very nature bears an inseparable relation to the State. Hence there was nothing more fitting than that the greatest display of the greatest exposition in all the history of expositions, should have been devoted to agriculture.

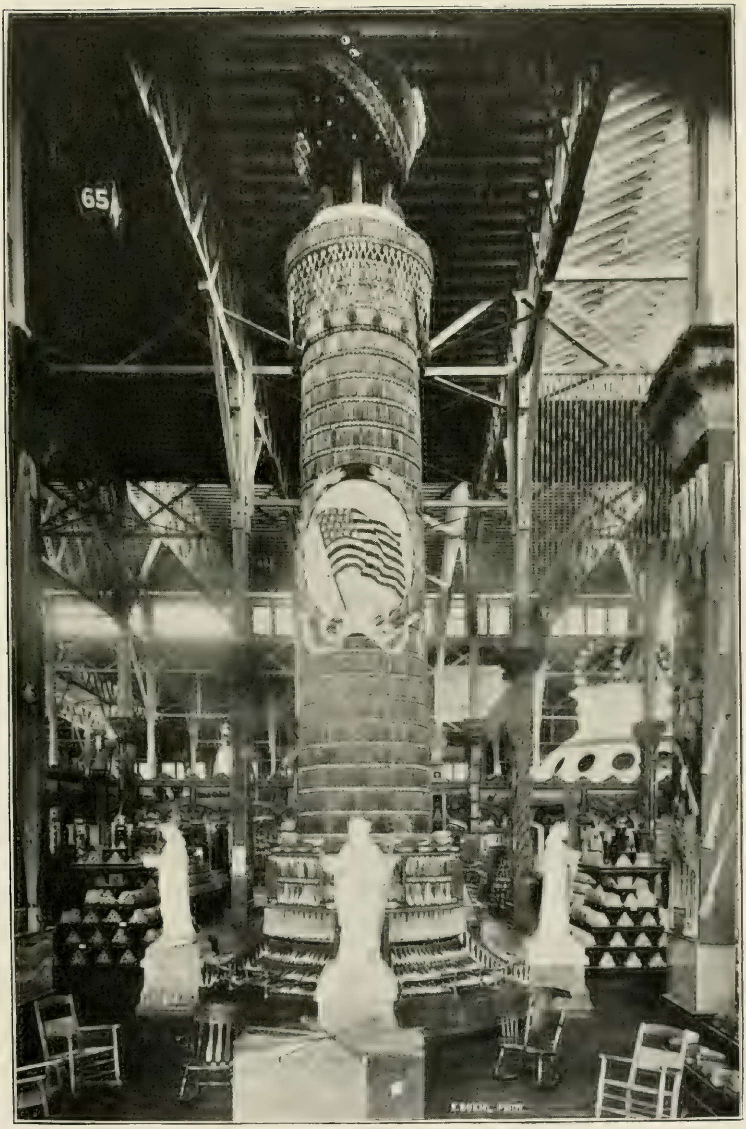
The Agricultural Building.—The building itself, with its twin palace of Horticulture, was badly located. It is the general verdict today that the Agricultural and Horticultural buildings should have been placed directly west of the Transportation building. The inconvenient position of the Agricultural building acted only as a temporary hindrance, for when its glories received their proper advertisement, the crowd thronging its aisles was always large. Although severely plain in architectural style, the building was graceful enough when viewed from a distance. It was 1,600 feet by 500 feet, and so immense that its interior did not reveal the fact that its south door was nearly twenty feet higher than the north entrance. The building contained a systematic arrangement of every exhibit pertaining to agriculture from the earliest day down to the present time. Fully one-fourth of the space was devoted to farm implements and machinery, and appliances whereby farm products are manufactured into the thousand and one things necessary to our daily life. This section of the building included fertilization and irrigation displays.

Special Displays.—The appliances and methods used in agriculture were also exhibited in many of the special displays, notably those of cotton, tobacco, dairying and the manufacture of food stuffs. All through these exhibits corn was specialized. The grains from each

state in the Union were given prominent places. The special corn exhibit not only included the best specimens from every state, but demonstrated the manufacture of corn into all of its products and by-products. If this exhibit had showed only what could be made from corn, it would have been worth months of study. The products and by-products of corn form a varied group consisting of starch, glucose, gum, dextrine, anhydrous and grape sugar, syrup, corn oil, corn rubber, corn oil cake, corn oil meal, gluten meal, canned corn, grits, samp, hominy, malt, whiskey, beer, dry wines of high alcoholic strength, alcohol, fusel oil, stover, ensilage, shucks, fodder and cobs. The same method of exhibit and treatment was given the canes, the beets and the sorghums. The best processes for dairying and cheese making were exemplified in a model dairy. Sections were also devoted to meats, fishes and vegetables—in fact to every known thing to eat or drink. And a section not of the least interest to the farmer, showed every insect with an essay upon its habits, and a herbarium of the diseases most common to plant life in America.

The Exhibits and Exhibitors.—The Agricultural building contained 12,056 exhibits of all sorts. These exhibits, private and otherwise, came from every country in the world, and exploited completely the products of each country and the industries which depended upon those products. The following countries had spaces: Argentine, Austria, Belgium, Brazil, Bulgaria, Canada, Ceylon, China, Costa Rica, Cuba, Denmark, Egypt, France, the French colonies, Germany, German East Africa, Great Britain, Greece, Gautemala, Hayti, Honduras, Hungary, Italy, Jamaica (unofficial), Japan, The Netherlands, New South Wales, New Zealand, Nicaragua, Peru, Porto Rico, Portugal, Roumania, San Salvador, Siam, South Africa, Spain, Sweden, Switzerland, Turkey (unofficial), Uruguay and Venezuela.

Russia's exhibit was in the Varied Industries building, and the East India exhibit, consisting mainly of teas, was in the East India building. The participation of these countries contributed largely to the beauty of the building. Among the foreign exhibits from the western world, there were worthy of special praise, the Argentine Republic, which, for corn, wheat and cattle, is destined in the future to be our chief competitor; Mexico with her gorgeous display of corn, coffee, rubber and semi-tropical products, and Canada, with a most perfect exploitation of her wonderland; the great Northwest with its wheat, grasses and cattle.



The central of the three corn towers in the Missouri Exhibit. This is a replica of the Louisiana Monument and is made of varied colored corn. The corn in this monument was furnished by every one of the 114 counties in the State.

THE UNITED STATES.

The Participation of the States.—Thirty-five states and territories participated in the agricultural display, the chief exhibits of which were as follows:

Arizona—Vegetables, wool and grasses.

Arkansas—Corn, cotton, vegetables and grasses.

California—Vegetables, canned fruits, wines, fruits and brandies.

Colorado—Vegetables, peas, beans, grasses and fruit.

Connecticut—Tobacco and corn.

Georgia—Vegetables, syrups, whiskey and corn.

Idaho—Grains and grasses.

Illinois—Cereals, corn and corn breeding.

Indiana—Collective exhibit of edible products.

Iowa—Cereals and grasses.

Kansas—Seeds, vegetables, flour, syrup, flax.

Kentucky—Tobacco, grains, grasses and whiskey.

Louisiana—Fertilizers, tobacco, cotton, sugar cane and vegetables.

Maryland—Cereals, canned goods, tobacco.

Massachusetts—Market gardening methods and tobacco.

Michigan—Cereals, grasses, wool, beet sugar and preserved fruits.

Minnesota—Cereals and butter.

Missouri—Corn, grains, grasses, wool, cotton, tobacco, vegetables.

Montana—Grasses, grains, vegetables and wool.

Nebraska—Grains and corn.

Nevada—Flour, cotton, wool, honey.

New Mexico—Angora goat fleeces, corn, honey.

New York—Cereals, butter, and seeds.

North Carolina—Tobacco, leaf and manufactured.

Oklahoma—Flour, broom corn, flax and wines.

Oregon—Corn, grain, grasses, dairying.

Pennsylvania—Cereals, grains, grasses, tobacco and wool.

Rhode Island—Potatoes, theoretical gardening.

South Dakota—Corn, grain, grasses and butter.

Tennessee—Peanuts, tobacco and cereals.

Texas—Seeds, corn, cotton, flour and wine.

Utah—Grains, vegetables, grasses, honey.

Virginia—Grains, grasses, tobacco.

Washington—Cereals, butter, hops.

Wisconsin—Seeds, grains, grasses, butter.

Artistic Exhibits of the States.—The states had two kinds of exhibits—the collective and the special. Not every state made a special

exhibit; but each exhibit, whether special or collective, was of the highest order of artistic excellence. The following special exhibits in the main aisle were masterpieces of the art, the result of thirty years experience in exposition making:

Virginia—A pedestal of many colored corn.

Indiana—A corn obelisk.

Missouri—The celebrated corn palace, by far the most beautiful of special exhibits, which will be described under "In Missouri."

Nebraska—Ruby red corn house.

Maryland—Corn peristyle.

Mississippi—King cotton, an heroic cotton figure, fifty feet high.

California—Golden Temple of Bacchus, flanked by four golden wine casks.

Georgia—A log cabin.

Colorado—Sugar beet pavilion.

Louisiana—Sugar cane with sugar mill.

Tennessee—Tobacco house.

Maryland—Indian tobacco statue.

Connecticut—Leaf-tobacco display.

North Carolina—Tobacco seed house.

Kentucky—Tobacco leaf display house.

The headquarters of the various states on the spaces alloted to them were equally beautiful. As a rule, staff work prevailed, ornamented with grasses, seeds and corn.

Prizes on Collective Exhibits.—The following were the grand prize awards on collective exhibits:

Missouri—Grasses and corn.

Iowa—Spring wheat, timothy, red clover and buckwheat.

Texas—Sugar.

Kentucky—Whiskey and tobacco.

Wisconsin—Rye, barley, dairy school exhibit and garden seed.

Georgia—Grain, field peas, tobacco.

Minnesota—Wheat breeding experiments in Blue Stem wheat.

Kansas—Wheat, barley, red clover, grains and Kaffir corn.

Utah—Irrigation exhibit, seeds and cereals.

Indian Territory—Corn.

Nebraska—Corn, sheaf and threshed grains, wild and tame grasses and twenty-six products of corn.

Pennsylvania—Tobacco, grasses, Delaine wool.

New York—Grains, seeds, canned goods, manufactured tobacco, wines, butter and preserves.

Illinois—State University Exhibit, Corn Breeders,' Corn Growers' Associations, Illinois Farm Boys' Corn Exhibit, glucose, grains, grasses, seeds.

California—Collective exhibit of eighteen counties, fruit, grasses, grains, peas, beans and wheat.

The Butter and Cheese Display.—One exhibit in the Agricultural building which speedily became famous was the butter statuary. Artistically this display begged no favor because its figures were moulded in butter. The participating states with their displays, were as follows:

Minnesota—The discovery of the falls of St. Anthony by Father Hennepin, by J. K. Daniels. Three figures in an Indian canoe, made of 1,000 pounds of highest average score butter—Awarded a Grand Prize.

Indiana—A group symbolic of cost and profit.

Nebraska—The horn of plenty—a cornucopia pouring out golden butter nuggets.

South Dakota—Butter flowers from native meadows.

North Dakota—An equestrian statue of President Roosevelt.

California—The symbolical wolves.

Oregon—A creamery scene.

Washington—Milking time—the maid milking the cow and feeding the cat.

Missouri—The old and the new way in dairy methods, an elaborate artistic production containing three thousand pounds of creamery butter, made for the State by the Blue Valley Creamery Company. The cow from which one of the figures was modeled, was subsequently sold for $2,350. Awarded a Grand Prize.

New York—Liberty Bell and a medallion of President Roosevelt. Awarded a Gold Medal.

Kansas—Dairy girl at work in creamery.

Illinois—Statues of Grant, Lincoln, D. R. Francis, J. V. C. Skiff and Frederick W. Taylor, Chief World's Fair Department of Agriculture.

Iowa—Dairy house and statue of John Stewart.

Connecticut—Regular dairy display in small packages.

Wisconsin—Milkmaid and cow—Awarded a Gold Medal.

The prizes awarded these displays were not given for dairy excellence, for in most cases the butter used was of low grade. The prizes were awarded solely upon artistic beauty.

Missouri in Comparison with Other States.—In addition to her corn

palace which was a special display put up at the request of the Department of Agriculture, Missouri occupied by far the most prominent place allotted to any purely agricultural state. Of the corn growing states of the Louisiana Purchase, Missouri's exhibit was decidedly the best. The display by states in the Agricultural building cost a small fortune. The following table is intended to be only approximate, as the authorities in charge would not announce definite figures. South Dakota, $10,000; North Dakota, $12,000; Colorado, $13,000; Kansas, $30,000; Nebraska, $30,000; Iowa, $35,000; Minnesota, $35,000; California, $..........; Missouri, $80,459.74. Missouri appropriated $100,000 for the agricultural display, $70,000 of which had been expended at the close of the Exposition, $60,000 for actual exhibits and their installation, and $10,000 for salaries and incidental expenses.

The Display Artistically and Otherwise.—The facts about the Missouri display are almost as interesting as the exhibit itself. It required 6,000 bushels of especially selected corn, 200 bushels of grains and grasses, and two tons of grass, wheat, oats, rye and straw to put up the towers, friezes, facades, pagodas and pictures which made the five blocks east of the main aisle the most beautiful spot in the Agricultural building. The Missouri exhibit had one advantage over every other in the building, in that its beauties were not obscured by staff work. The five blocks of exhibits were made up of the real material produced on the farms and in the orchards and gardens of the State and the arrangement was both logical and practical.

One feature of the display which attracted immediate attention was the two immense pictures on the west wall, in the State's section, the 6,000 acre corn field of David Rankin's Atchison county farm and the Model Missouri Farm. These pictures were each 35 by 15 feet and were made entirely of grains and grasses. They were built by the great French-Canadian decorator and artist, Mr. J. D. Fortier of Toronto, and were the most gorgeous pieces of work of this character ever attempted. They cost the Missouri Commission $3,000. Mr. Fortier also assisted in the other decorative work.

Within the staff work which surrounded the entire space of Missouri's exhibit were smaller pictures forming a progressive history of the art of agriculture, each picture made from grain, grasses, mosses, corn and parts of corn. The pictures in this richly tinted mural group represented every phase of agricultural life, from the most primitive days down to the present time; the old way, the new way, fields, farm work, and cattle in green pastures.

Two other artistic features of the exhibit were the two corn towers, one of white and one of yellow ears, each 38 feet high with the Louisiana Purchase Monument 45 feet high between them, and two flags, the stars and stripes, and the Louisiana Purchase Emblem, made of undyed, many-colored shucks and blades of corn.

The Central *Corn Palace,* to which reference has already been made, would have been in itself a creditable State display. Sitxy-five feet high and 40 feet in base diameter, it was, next to the Matchless Festival Hall, the most graceful dome on the exposition grounds. It was not only an admirable lounging room for tired Missourians, and a convenient meeting place for everybody in the great building, but it was worthy of note as containing the very finest specimens of all varieties of Missouri corn and a sample of nearly every agricultural product which the State produces.

The Missouri Commission and the Exhibit.—The average visitor in the Agricultural building, farmer though he may have been, had only a general idea of the plan pursued in organizing the working force, gathering the materials for the State's display and erecting the artistic part of it in the building. Every expenditure for every purpose made by the State at the exposition was under the direction of the Missouri Commission appointed by Governor A. M. Dockery, consisting of the following members: M. T. Davis, President; F. J. Moss, Vice-President; B. H. Bonfoey, Secretary; J. H. Hawthorne, treasurer; L. F. Parker, J. O. Allison, D. P. Stroup, N. H. Gentry and W. H. Marshall. J. O. Allison was Commissioner of Agriculture for Missouri.

The Missouri Agricultural exhibit was under the direct supervision of Dr. H. J. Waters, who is Dean of Missouri Agricultural College and one of the most active members of the State Board of Agriculture. The inception of the general plan of the exhibit is due to Dr. Waters' knowledge of scientific and practical agriculture, together with his earnest desire to place the agriculture of the State in the position that its importance demands. Hon. Mat. W. Hall and Col. G. W. Waters, both experienced and successful farmers, were the able assistants in this department and too much credit cannot be given each for the able assistance rendered. To the Allen Decorating Company of St. Louis, chief decorators for the Missouri Commission, is due the fine artistic effect of this superb exhibit.

After months of arduous labor in collectintg and installing the exhibit, Dr. Waters resigned his position and went to Europe for a year's study. The Commission exercised the best judgment in selecting Hon. Mat. W. Hall of Saline county to succeed Dr. Waters. Mr.

Hall has made an admirable officer, able, courteous and an indefatigable worker where the State's interests were concerned. He and his chief clerk, Mr. Dudley, have worked ten hours a day at clerical tasks for months. The Missouri Commission, individually, deserves like praise. On December 1st, President M. T. Davis had not been in a half dozen of the fair's main buildings, so exacting had been the duties of his office.

The Display—Its Collection.—The materials for Missouri's display came from various sources. There were, for instance, 345 private exhibits. These exhibits comprehended everything produced in the State. The greater part of the exhibit, especially corn, was collected at county corn shows held for the purpose in co-operation with the Farmers' institutes conducted by the State Board of Agriculture. At these corn shows a premium of $50 was offered for the best corn, the corn to belong to the Missouri Commission.

Missouri's Great Variety.—In the variety of the products of the soil Missouri easily surpassed any state or nation in the world. The State not only produces variety, but produces abundantly and of the highest quality. In the year 1902 Missouri produced more bushels of corn per acre than any State in the Union; for three years, 1902-3-4, Missouri produced, according to Uncle Sam's reports, an average yield per acre of 5 bushels more than Kansas, 22 bushels more than Nebraska and 1.7 more than Iowa. In both quality of fiber and amount of yield per acre Missouri's cotton fields of the southern counties excel that of any other State.

The great variety of products adapted to the State is clearly shown by the following list of exhibits, all of which are profitably raised: Corn, oats, wheat, alfalfa, rye, millet, flax, bluegrass, Kaffir corn, popcorn, sugar corn, buckwheat, potatoes, white clover, red clover, alsike clover, crimson clover, sweet clover, meadow fescue, hemp, cowpeas, Canada field peas, soy beans, blue stem, broom corn, sorghum seed and syrup, sunflower seed, egg plant, castor bean, cabbage, asparagus, pumpkins, beets, onions, rhubarb, wines, apples, and other fruits, including 430 different kinds, melons, cantaloupes, timothy, clover seed, sweet potatoes, tobacco, navy beans, turnips, cider, squash, cucumbers, peppers, emmer, radishes, ginseng, brandy, honey and many others of less importance.

The Prizes and Awards.—There is a mistaken idea prevalent throughout the State concerning the exposition awards, what they are, what they represent, and the methods by which they were given. We wish that it were otherwise, for we dislike very much to say it—the

awards are not to be taken too seriously. The awards were divided into four classes: a grand prize, the highest award made, which was simply a diploma; 2nd, a gold medal worth $65; 3rd, a silver medal, worth $20, and 4th, a bronze medal worth $3. These awards were not prizes in the ordinary interpretation of that term in that they were not exclusively conferred. They represented orders of excellence, which to the uninformed, will explain the seemingly paradoxical circumstance of any article having several medals of the same rank. The awards were made by two juries, the jury of recommendation and the superior, or jury of appeal. The work of these juries did not always meet with the popular approval. One thing is certain; the millions who marched through the seven miles of aisles in the Agricultural building, by common consent, gave Missouri many times the awards she received at the hands of the powers that were—up stairs in the Agricultural building. For list of awards see report of Missouri Commission on another page.

HORTICULTURE.

The Building.—The Horticultural building was located immediately south of the Agricultural building. Although one of the most inaccessible structures on the exposition grounds, it was admirably adapted to the purposes for which it was erected. It was the best lighted of all the exposition palaces.

Some State Displays.—The Horticultural building was beautiful as a whole chiefly because the various State displays were more nearly uniform than in any other building. Missouri, Mississippi and California possessed the notable displays. The pecan horse of Mississippi attracted its share of attention. California's display was elaborate, costly and imposing with its many facades of Mission architecture. The fine, actual picture of the Riverside Orange growing country was, next to the two farm scenes in Missouri's agricultural exhibit, the finest thing in the exposition of its sort.

The Missouri Display occupied 7,700 square feet of the building, and was located advantageously, immediately in front of the main entrance. The exhibit spaces were surrounded by arches and facades of white staff work, with fruit and flower designs everywhere. On space 29 was the crowning feature in the building—Missouri's exhibit. A pagoda with small fountains at the ends and center capable of holding twelve stands of fruit. The name "Missouri" in gold letters was engraved on the facades. Around the exhibit space was a miniature elevated railroad track and train from the State's fruit

country. All around were the tables, jars and plates, ladened with the best the State can produce.

Varieties.—"On tables, in glass jars, cases and on specially designed plates, Missouri's display of fruit occupied this large space. Every inch of space was filled with the finest fruit. Nearly two hundred varieties of apples were shown and for nearly five months fresh apples were daily upon the tables, while apples from cold storage were shown for the entire seven months of the exposition period. Five hundred bushels of apples were given away on Apple Day, October 4. Seventy-two varieties of apples were shown, with fresh peaches on the tables daily from June 15 to December 1. Over sixty bushels of different varieties were exhibited at one time an unexampled picture. On August 15, Peach Day, five hundred bushels, a full car load, were distributed to visitors. Two thousand plates of pears, of forty-eight varieties were shown from August to December 1. Among the other fruits shown were one thousand plates of grapes with 124 varieties, one thousand plates of strawberries with sixty-four varieties, five hundred plates of cherries with twenty-four varieties, four hundred plates of plums with thirty-two varieties, sixty plates of apricots with six varieties, twenty plates of nectarines with two varieties, one hundred and sixty plates of quinces with six varieties, three hundred plates of gooseberries with eight varieties, one hundred plates of currants with six varieties, two hundred plates of raspberries with twenty-four varieties, three hundred plates of blackberries with eight varieties, one hundred plates of dewberries with two varieties, twenty-four plates of mulberries with four varieties, one hundred and twenty plates of huckleberries with two varieties, one hundred plates of persimmons, pawpaws, crab apples and thorn apples with eighteen varieties. Ten show cases of Missouri nuts, illustrating forty-eight varieties. There were two thousand four hundred jars of fruit in solution, illustrating four hundred and thirty varieties. Altogether six hundred and ninety-four varieties of fresh fruits were shown, a display unequaled by any state or country. Out of the one hundred and fourteen counties of Missouri, ninety-six were actually represented by fruit. The Missouri Horticultural Society, the individual fruit grower and horticultural department of the Missouri Agricultural College contributed materially to the sources of the exhibit. The exhibit was beautifully displayed and was especially popular. On its educational side it taught the adaptability of varieties to particular localities, the value of soils and subsoils, elevation, cultivation, pruning and spraying, packing and marketing and cold storage, and various points which confront every fruit grower."

Missouri's Horticultural Exhibit occupied 6,600 square feet of space and embraced every variety of fruits and nuts produced in the State.

Of the different varieties of fruits displayed the following were most popular in the order named:

Apples—Jonathan, Gano, Ben Davis, York and Winesap.

Peaches—Elberta, Buck, Old Mixon, Salway, Champion and Family Favorite.

Pears—Keiffer, Bartlett, Duchess.

Grapes—Concord, Worden, Moore's Early, Niagara and Newton's Virginia.

Strawberries—Warfield, Crescent, Haverland, Bubach, Jessie and Parker Earl.

Plums—Burbank, Wild Goose and Damson.

The cost of the display was $51,667.20. The horticultural board, consisting of Hon. L. A. Goodman, C. H. Dutcher, W. G. Gano, W. P. Flournoy and J. C. Whitten, deserve a great deal of credit for the beautiful Missouri exhibit.

Missouri in Comparison.—Missouri easily outranked the other Louisiana Purchase states. She more than held her own with California, outranking her in variety. But there was one state display which ought to have furnished food for thought to all of the fertile states of the Mississippi valley, and that state was Connecticut. The Connecticut display consisted entirely of pictures exploiting the beauty and perfection of the state's landscape gardening and park making. The lesson taught by the Connecticut exhibit, namely, the art and the necessity of doing things well, will one day be learned in this section; and when it is learned there will not be a bare nor an ugly spot in all Missouri's 69,700 square miles.

COTTON.

Missouri Cotton.—That the quality of the cotton grown in Missouri is of the very best is proved by the fact that the only bale of Missouri cotton exhibited received a grand prize for its high standard of excellence. The exhibit was made by Mr. W. N. Burns, of Gibson, Dunklin county.

The State produced in 1904, on 74,988 acres, a total yield of 24,-451,690 pounds of lint cotton, valued at $2,272,660. Dunklin county produced 60 per cent of the total for the State. It may not be generally known, but it is true, nevertheless, that in quality and length of fiber and average yield per acre, Southeast Missouri excels the other states of the Union.

For list of awards in horticulture see report of Missouri Commission on another page.

DAIRYING.

(From the Report of the Missouri Commission.)

The history of dairying in Missouri is not unlike that of other countries. It's a story of early obscurity and future prominence. It's an old story and yet like the old, old story of love that for six thousand years has been whispered in the ears of millions of willing listeners, and millions more of impatient, anxious mortals are waiting for it to be told over and over again to them, it is ever refreshing and acceptable to all of the people of some countries and some of the people of all countries.

Since the persistent wandering of a nation of people, thousands of years ago, for forty years in the wilderness, to keep from getting into

HOLSTEIN BULL "SARCASTIC LAD."

Champion aged bull and grand champion, all ages, St. Louis, 1904. Now owned by Illinois Agricultural Experiment Station.

a dairy country where they would have to milk, history has repeated itself many times and the favorable conditions that have existed in different sections for doing a profitable dairy business has been disregarded for the promotion of some other branch of agriculture less profitable.

Like all other countries engaged in dairying, Missouri required a practical illustration of the benefits to be derived from an active interest in this particular branch of agriculture, before the industry was nurtured and fostered to any great extent. The resources of Missouri were so varied and so extensive and pronounced in all of them, the faithful Missouri cow was neglected for the Missouri mule. The production of milk was neglected for the raising of beef. The manufacture of butter was of no consequence compared with the raising of corn. Instead of cheese factories, the country abounded in tobacco barns. Finally the people of this great commonwealth "were shown." Their attention was called to the fact that this was the best climate in the world for obtaining the greatest results in dairying; that Missouri possessed the most luxuriant growth of grass and the best quality of any State in the Union; that our country was well watered, and that all of the conditions were favorable for making this an ideal dairy country in which the business might be carried on with a greater profit than in any other country. The evidence was sufficient and in three or four years Missouri grass was being converted into milk, Missouri milk was being made into butter and cheese. The cattle on a thousand hills were high grade milk cows. The wonderful crops of grain and roughness (suitable for the production of milk) that never failed were sold to the highest market in all the country, and sold for cash to the Missouri mortgage lifter, the faithful dairy cow. The outcome of this dairy sentiment and the inauguration of this business was the establishment of modern creameries in Missouri, among them the largest creamery in the world, the building of dairy barns, of which Missouri boasts the finest in the world, the erection of silos, the changing of corn land into pastures, the breeding of better stock, the making of better roads, the building of better houses, the beautifying and adorning of rural homes, and the encouragement of an enormous immigration by those people engaged in dairying, seeking the country where the largest amount of milk could be produced at the least cost and with the least labor.

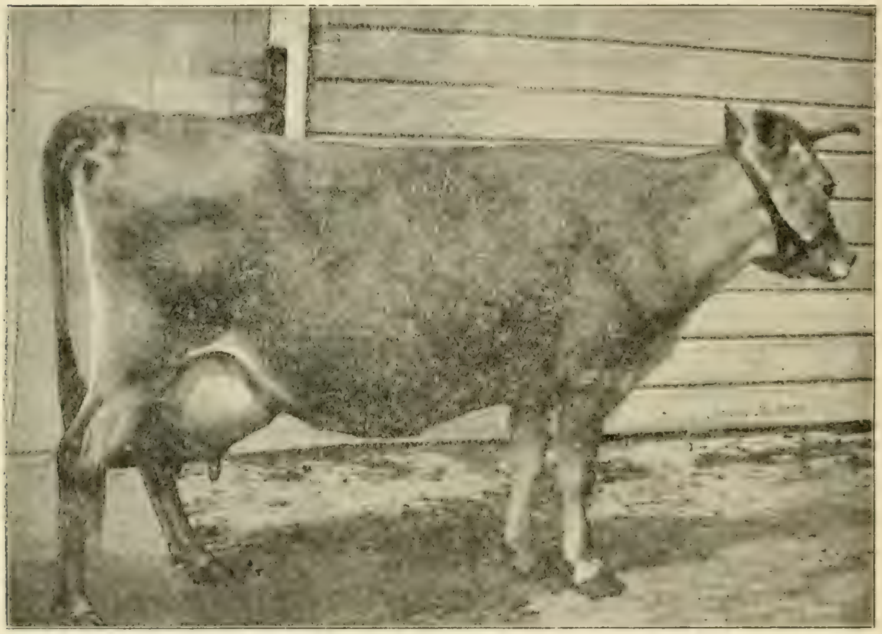
The Missouri farmer had carefully considered the matter. With his characteristic, conservative and careful disposition, he investigated the proposition thoroughly and, when his mind was settled, when he decided that dairying was the thing, he went at it right, and by his actions he said, "We will set an example worthy of imitation."

He accepted up-to-date methods. He bought the best cows. He bred for butter, for milk, or for cheese, according to the demands of his particular market. The men who lived close to St. Louis, Hannibal, Kansas City, or St. Joseph, and other cities, and were willing to sell

all of their milk, prepared to furnish their respective places with milk for family use, and the consequences—Train loads of good, pure, unadulterated milk may be seen going into the larger cities, and car loads and wagon loads into the smaller places every morning.

The pure quality of this milk increased the consumption, and with the increased demand the price got better and the dairyman felt compensated for early rising and for the work necessary to prepare his product for market.

The man who lived farther from market, and the man who wanted his milk to raise calves and pigs, the man that used to be entirely left because of his location, was not forgotten. In the new order of things he was well taken care of. He was provided with a good market, and



JERSEY COW "OONAN OF RIVERSIDE," 69773.

Official record for seven days is 355.4 pounds of milk, which produced 34 pounds 3 ounces of butter. This photograph taken in her fifteenth year. Owned by Dr. C. E. Still Kirksville, Mo.

every day the roads were lined with light wagons that glistened with milk cans full of good, rich cream on its way to the nearest railroad station, to be shipped to some large centralized creamery in Kansas City, St. Joseph, Hannibal, or some other enterprising Missouri city.

Thousands of hand separators were sold. The cream was taken out of the milk while fresh, and the clean, warm skim milk was used

to raise good calves; and Missouri became a wonderful example of the many profits in dairying.

Missouri sunshine, Missouri water, Missouri grass, Missouri feed, are all being used to produce milk, out of which an immense amount of butter and cheese is being made and the by-products go to raise calves and make pork. The size of Missouri, its climate, its location, the favorable conditions, all go to make it the future "Promised Land" of America, the central butter market of the world.

Missouri has 750,000 to 800,000 dairy cows, and at the same time has sunshine and water and grass and feed and room enough to support 10,000,000.

Missouri's experiment station, which is in connection with the State University at Columbia, has a dairy building second to none in the United States, and the influence of the work done there is being felt to a marked degree all the time.

Some remarkable records have been made by Missouri dairymen. Among these might be mentioned Mr. Coleman, of Pettis county, who averaged from seven cows, in 1903, 400 pounds of butter each. He fed the skim milk to hogs, and after paying for all the feed given to his cows and hogs, he had a net profit of $850 from the proceeds.

A Nodaway county man reports making $6,000 in six years on forty acres in the dairy business, and started absolutely without any capital.

Goodrich Bros., of Henry county, have a herd of thirty cows that average 375 pounds of butter a year.

Mr. Koontz, of Jasper county, has a herd of twenty-five to thirty cows that has averaged for several years nearly 400 pounds of butter a year.

Hosmer & Son, of Marshfield, has a herd of seventy-five cows that averaged them last year over 350 pounds of butter, one cow making 560 pounds.

Mr. Schelpman, of Greene county, realized last year from his herd of twenty-five cows over $125 a head.

Besides these there are hundreds of others of the same kind of records, all of which go to show the adaptability of Missouri for successful dairying, and is sufficient explanation of why so much interest is being taken in the business all over the State.

This interest is universal because the entire State is adapted to dairying. There is no section where conditions are unfavorable and there is no section that, to any marked degree possesses advantages over the rest of the State. Missouri, as a whole, is a dairy state, and the

possibilities in every county for the production of milk in large quantities at a minimum cost, are unsurpassed anywhere in the world.

The peculiar conditions that exist in Missouri favorable to the dairyman makes him fearless of competition, because he knows there is no country where they can produce a pound of butter cheaper than he can here. This is not all that interests him. He is convenient to a good market. The very large manufacturing, commercial, and railroad interests of Missouri, her educational advantages as shown in academies, seminaries, and universities almost without number, together with the advantages of a good healthy climate, have all gone to make a large population in our towns and cities.

These are all consumers and each additional one has increased the outlet and improved the market for the producer. Besides this, Missouri's market for dairy products is enhanced because of its proximity to a section where the resources of the people are in other lines, and where they depend on some other country for their butter and cheese.

ART IN BUTTER.

Missouri's butter exhibit at the Louisiana Purchase Exposition is the greatest exhibit in its line the world ever saw and is regarded as one of the prominent attractions at this most wonderful World's Fair.

The Missouri Commission expended in the installation of this exhibit nearly ten thousand dollars and it is not only of wonderful magnitude, but shows in every detail the workmanship of a master artist. It tells a story that has not only interested those who have seen it, but in addition has impressed those interested with the importance of this branch of agriculture. Hundreds of thousands of people have seen this exhibit and the verdict has been universally the same—"A wonderful exhibit." Hundreds of people have expressed themselves as being fully compensated for the expense of a trip to the World's Fair in this exhibit alone, even by some as far away as London, England; Edinburgh, Scotland, and Gouda, Holland.

In this impressive story so beautifully told in butter, through the skill of the sculptor, Mr. Neilsen of St. Louis, there is more than appears on the face of it. Like a western mirage, there is reflected a wonderful and attractive picture in which can be seen a country that has reached the highest state of agricultural development; and a million and a half people on the farm enjoying all the comforts and luxuries that come with prosperity and success, as well as two millions of people in the cities of Missouri being furnished with the purest dairy products fresh from the farm and the factory.

This picture has been engraved on the tablet of the memory of those

who have seen it, never to be effaced or grow dim. And as they go to their homes in every quarter of the globe, its influence will be felt and it will always be a reminder that a cordial welcome and a happy home awaits those who desire to cast their lot and spend their lives in a land of milk and honey.

In making a very liberal appropriation for the Dairy Department at the World's Fair, the Missouri Commission had in mind strictly a dairy exhibit; not only a work of art to be admired by the hundreds of thousands that would see it, but to impress our people with the importance of this branch of agriculture, tell our visitors what was being done now and show to the world the wonderful possibilities and golden opportunities along this line in the great commonwealth of Missouri. Their work in this direction has been completed. The great crowds of people who have seen this exhibit and into whose hands this little pamphlet may fall, must decide whether or not their effort has been in vain. Your decision will be final and your verdict will be satisfactory.

The central figure in this exhibit is designed to represent "Ceres," the Goddess of Agriculture, holding a sickle in her hands, and to complete the group, on either side is a model of the highest type of dairy cows. The one on the right represents the Jersey breed, and is modeled from a famous cow of Dr. Still's, at Kirksville, Missouri. This cow was entered in the World's Fair stock show and won a prize. She was sold Monday, September 19th, for $2,350.00 to a resident of New York. This cow's head and neck is resting on a sheaf of wheat and her nose is in the lap of "Ceres." On the top of her neck the left arm of the goddess is supported. As an evidence of the work done by the artist as shown in the perfect likeness of this cow, the children of the owner of the original when they saw this model, recognized it as their cow and called it by name. The cow on the left represents the Holstein breed, and is modeled from a very famous cow of M. E. Moore's at Cameron. This cow was in the test at the World's Fair and made 270 pounds of butter in niety days. The owner of the original of this model pronounced this a perfect likeness or reproduction.

This entire exhibit is made of solid butter, absolutely pure, there being used over 3,000 pounds. This is one of the remarkable features of the exhibit, as the usual way is to make the statues out of something else, and cover them with butter. The butter out of which this exhibit is made is the product from 75,000 pounds of milk, or 9,000 gallons, which would be equal to an average milking from 6,000 cows. On the walls of this space an impressive story is told of the progress made in dairy methods and the manner of handling the raw material, in frieze work. The walls are covered several inches thick with butter, and the figures

used are made in bold relief. Commencing at the left on the end space is the figure of a woman churning with the old-fashioned churn. In the next corner is a woman skimming a pan of milk on which the cream has raised by the old gravity process. This represents the "old method." Between the two, on the floor of a scantily furnished log house, is a boy feeding a dog. To the right of this, at right angles, is the mother playing with her children, while a boy is separating the milk with a centrifugal separator. This represents "the new method." Around the corner from this is a reproduction of the seal of the State of Missouri. All of this is done in butter. This exhibit is in a refrigerator with a glass front of three thicknesses of plate glass and an air space between each two. At one end of the case is an ice-making machine in constant operation, and the temperature inside of the case is kept below freezing. The space occupied by Missouri's butter exhibit is eight feet by twenty-eight feet, making 224 square feet of floor space, and about 325 square feet of wall space. The work done on it was equal to three months work for one man, and its magnitude is commensurate with the possibilities of the great State represented by it.

MISSOURI'S BIG CHEESE.

In its design and construction, Missouri's cheese exhibit is a wonderful thing, because of its being the first and only one of the kind. In its size it is typical of the extensive scale on which Missouri carries on all

MISSOURI'S BIG CHEESE.

Three thousand five hundred pounds of milk used in making, furnished by 150 dairymen.

lines of agriculture. This is a full cream cheese and weighs over 3,000 pounds. It required ten men to unload it and put it in the case, and it took four horses hitched to a heavy truck wagon to haul it from the freight car to the Agricultural building. As indicated on the card inside of the case, it was made in Altamont, Daviess county, in which part of the State a large proportion of Missouri's cheese factories are located. On the face of the cheese is moulded a typical milk cow, represented as being in clover with a milkmaid by her side, sitting on a stool, engaged in milking. To make this cheese required 35,000 pounds of milk, a car load and a half, one milking from 3,000 ordinary cows. The milk out of which this cheese was made was purchased from 150 dairymen. It is seven feet in diameter and was put into the case where it is now on exhibition in the original hoop in which it was pressed. This case is made exactly the same as the butter case, and the temperature is held at about 35 to 40 degrees.

For classified list of prizes on butter and cheese see list of awards on another page.

MISSOURI LIVE STOCK.

The different classes of live stock are only so many intricate machines which convert at a profit to the farmers the raw materials of the

FOUR PRIZE WINNING MULES.

Topsy, Mollie, Babe and Bettie. Owned by W. A. Elgin, Platte City, Mo.

farm into a finished product. No country has ever maintained for a great length of time a successful and profitable system of agriculture without making live stock farming the basis of that system. No state or country is endowed with greater natural advantages for producing a high quality of domestic animals than is Missouri, and in addition to what nature has done for this State, the men who are engaged in the breeding, fattening and training the animals produced are as well skilled in the science of animal husbandry as any other people in the world as a careful examination of the records of the great competitive live stock expositions which have been held during the last twenty years will unquestionably prove.

Climate, Feed and Water.—The climate of Missouri is temperate and is not marked by the extremes of heat and cold that are found in the more northern countries. The cold of the winter is not so severe as to make it necessary to provide expensive barns to protect the stock, neither is the heat in the hottest of the summer oppressive. The average annual mean temperature for the State is 54 degrees and the average annual mean temperature for January is only 30 degrees, while the average mean temperature for July is only 77.5. The average annual rainfall computed from the records of the Weather Bureau is 39.5 inches, only 6.49 inches of which falls during the three winter months. The average annual rainfall for the three spring months is 11.97, and for the summer months is 12.12 inches. The abundant rainfall, admirably distributed as to season, coupled with the mild equable climate (only two months in the year i. e. January 30 degrees and February 30 degrees, have an average temperature below the freezing point) gives Missouri natural advantages unsurpassed for growing a great variety of grains, grasses and leguminous plants, all of which are necessary in the economical production of a high quality of live stock. Another essential in growing live stock is an adequate supply of water of good quality. Missouri is checkered by the greatest river system in the world—the Mississippi—Missouri system—and every one of the one hundred and fourteen counties is drained by the tributaries of this system. Fine springs and deep wells of water containing just the right amount of mineral matter to supplement the great variety of grains and grasses, are found in all parts of the State, and no farmer need ever be in dread of a water famine to cause loss on his live stock.

Missouri Live Stock in Competition.—The above paragraphs point out some of the natural advantages possessed by the State for the production of a high class of stock. To prove that Missouri farmers have taken advantage of their favorable environment, it is only necessary to examine the records of some of the great competitive live stock shows held within the last few years.

MULE "LILL."

A first prize winner, World's Fair, 1904. Three years old, 17 hands high, weight 1,560 pounds. Owner, J. P. Wilson, Wellsville, Mo.

At Chicago—At the World's Columbian Exposition held in Chicago in 1893, Missouri breeders again met in competitive exhibition the most successful breeders of the world, and again they demonstrated their ability to produce animals of the highest quality. In saddle horses Missouri won twenty-three premiums including the sweepstakes premium on saddle stallion, any age. In jacks and mules Missouri won seven premiums. On Aberdeen Angus cattle, Missouri won 24 premiums including 5 sweepstakes. In Shorthorn cattle 18 awards, including two sweepstakes were given Missouri breeders. The Hereford breeders captured 17 sweepstakes premiums. Red Polled breeders were awarded 17 prizes including sweepstakes on herd. The Jersey breeders of the State captured 27 prizes. In the swine department Missouri was awarded 106 prizes. On sheep Missouri received 74 awards, including 10 sweepstakes premiums.

At Omaha—At the Trans-Mississippi and International Exposition held at Omaha, Nebraska, in 1898, Missouri breeders received one hundred and forty-six premiums on hogs and cattle, a greater number than any other state. In the grand parade of cattle at the close of the Exposition, the herds were arranged according to their merit, as shown by the awards of the judges, and "A Missouri herd was first, a Missouri herd was second, a Missouri herd was third, a Missouri herd was fourth and a Missouri herd was sixth;" not quite the whole show but pretty near it.

Missouri Live Stock at Louisiana Purchase Exposition.—The greatest collection of live stock ever assembled was seen at this, the greatest of all expositions. The exposition company appropriated the magnificent sum of $280,307 for live stock premiums, and this sum was supplemented by special and state premiums to the amount of $258,395, making a grand total of $538,702. Missouri won in all classes, competing against the world, the handsome sum of $27,255.00 from the Exposition, besides the money won from prizes offered by breeders' associations and state prizes. The Missouri Commission very liberally set aside $100,000 for premiums and expenses for Missouri exhibitors, and of this amount the cattle raisers got $34,820; horsemen, $18,517; hog growers, $21,005, and sheep growers, $2,130. Missouri duplicated all cash prizes awarded to stock owned in the State, and in addition awarded prizes in competition with Missouri animals only. Altogether Missouri breeders won 690 World's Fair premiums on live stock, not counting the State prizes, a number not equalled by any other state or country. Missouri's rank is readily seen by a study of the awards, a copy of which is appended to this article. Of the total awards Missouri not only received many first and second prizes but her breeders also won 27 grand prizes where com-

petition was limited to first prize winners, and also 13 grand champion prizes, where competition was limited to the animals winning grand prizes.

Missouri wins twenty-seven Champion Prizes and thirteen Grand Champion Prizes.

CHAMPION PRIZES.

(Competition limited to First Prize Winners.)

FRENCH COACH HORSES.

Stallion, three years and over	W. McLaughlin	Kansas City

PERCHERON HORSES.

Stallion, three years and over	W. McLaughlin	Kansas City

JACKS.

Jack, three years and over	L. M. Monsees & Sons	Smithton
Jack, two years and under	L. M. Monsees & Sons	Smithton
Jennet, three years and over	L. M. Monsees & Sons	Smithton
Jennet, two years and under	L. M. Monsees & Sons	Smithton

SHORTHORN CATTLE.

Bull, two years and over	Tebo Land & C. Co	Clinton
Fat steer or heifer, any age	Purdy Bros	Harris

HEREFORD CATTLE.

Bull under two years	Stewart & Hutcheon	Blockow
Heifer under two years	O. Harris	Harris
Fat steer or heifer	S. L. Brock	Macon

GALLOWAY CATTLE.

Cow, two years and over	C. N. Moody	Atlanta

JERSEY CATTLE.

Heifer, under two years	C. E. Still	Kirksville

HOLSTEIN FRIESIAN CATTLE.

Bull, two years and over	W. F. Holstein Association	St. Louis
Bull, under two years	M. E. Moore	Cameron
Cow, two years and over	W. F. Holstein Association	St. Louis

POLAND CHINA HOGS.

Boar, one year and over	Winn & Mastin	Martin City
Boar, under one year	Winn & Mastin	Martin City
Barrow, any age	Winn & Mastin	Martin City
Three barrows, any age	Winn & Mastin	Martin City

BERKSHIRE HOGS.

Boar, one year and over	N. H. Gentry	Sedalia
Sow, one year and over	N. H. Gentry	Sedalia
Sow, under one year	N. H. Gentry	Sedalia
Barrow, any age	N. H. Gentry	Sedalia
Three barrows, any age	N. H. Gentry	Sedalia

DUROC JERSEY HOGS.

Sow, one year and over	McFarland Bros....Sedalia

CHESTER WHITE HOGS.

Boar, one year and over	L. L. Frost....Mirabile

GRAND CHAMPION PRIZES.

(Competition limited to Champion Winners.)

FRENCH COACH HORSES.

Stallion, any age	W. McLaughlin....Kansas City

PERCHERON HORSES.

Stallion, any age	W. McLaughlin....Kansas City

JACKS AND JENNETS.

Jennet, any age	L. M. Monsees & Sons....Smithton

SHORTHORN CATTLE.

Bull, any age	Tebo Land & C. Co....Clinton

HEREFORD CATTLE.

Fat steer or spayed heifer, all breeds and ages	S. L. Brock....Macon

GALLOWAY CATTLE.

Cow, any age	C. N. Moody....Atlanta

HOLSTEIN FRIESIAN CATTLE.

Bull, any age	W. F. Holstein Association....St. Louis
Cow, any age	W. F. Holstein Association....St. Louis

POLAND CHINA HOGS.

Boar, any age	Winn & Mastin....Martin City

BERKSHIRE HOGS.

Boar, any age	N. H. Gentry....Sedalia
Sow, any age	N. H. Gentry....Sedalia

DUROC JERSEY HOGS.

Sow, any age	McFarland Bros........Sedalia

CHESTER WHITE HOGS.

Boar, any age	L. L. Frost........Mirabile

In all classes Missouri made a good showing and received a full share of the prizes, and fully sustained the reputation of the State, as being the first live stock State in the Union.

For a complete list of live stock prizes see classified list on another page.

MISSOURI POULTRY.

The conditions which are favorable to Missouri as a live stock State are equally favorable for the economic production of high class poultry. According to the United States census, Missouri had in 1900 a greater number of farms reporting poultry as one of the sources of income than any state except Texas. Of the whole number of farms in the State 284,886, ninety-four per cent, or 265,203 produce poultry. Since the census year prices of poultry have advanced and a greatly increased product has been the result. It is estimated by the State Board of Agriculture that for the year 1904 Missouri produced chickens, turkeys, geese and ducks to the value of $12,573,330; eggs were produced to the amount of 93,723,620 dozens, valued at $11,715,450; feathers valued at $305,000; a grand total of the poultry product for one year of $24,593,780.

Missouri Poultry at the World's Fair.—Missouri breeders made at the World's Fair, to compete with the finest poultry of the world, 1,142 entries of chickens, turkeys, geese and ducks, 242 entries of pigeons and pheasants and 86 in Belgian hares and rabbits, exceeding the whole number from all other states and territories. Missouri won 377 premiums out of a possible 617, a record never before equalled. Of the first prizes awarded in the different classes of poultry Missouri raisers won the following: Seventeen first prizes on chickens; six on turkeys and two on ducks.

MINES AND METALLURGY.

Wealth of Minerals.—Nature was lavish in her gifts for the great State of Missouri. She not only provided the State with vast areas of valuable forests and with immense plains of rich agricultural lands, but she stored in the hidden recesses of the earth a multitude of minerals which the present partial development would make us believe "that in

richness and extent the mines of Missouri are paralleled by no other mineral district in the world."

Coal, Lead and Zinc.—Nearly 40 per cent of the surface of the State is underlaid with a fine quality of bituminous coal. In thirty-seven counties coal mines have been developed and the annual output for the year 1903 was 4,600,000 tons, valued at $6,716,000. The value of the coal product of the State has increased more than 121 per cent in the last 15 years, and even a greater development may be expected in the future on account of the number of new mines that are being opened.

Missouri's Mines Exhibit at the Fair.—The following paragraphs from the report of the Missouri Commission gives in detail an account of the exhibit:

"Our principal exhibit was that in the Mining Building, and the plan was based on two main ideas: First, to adequately exhibit all of Missouri's various mineral resources, including those which are comparatively or wholly undeveloped; second, to arrange the details of the exhibit so as to attract the attention of the greatest possible number of people.

In securing materials to put the first idea into effect, marble, granite and other building stones were actually quarried for our needs; and blocks of coal, crystals and ores were specially mined for the exhibit.

The resources exhibited were as follows: The various ores of zinc and lead, massive and cabinet specimens; all varieties of iron ore found in the State, massive and cabinet specimens; coal in large blocks and cabinet specimens; fire clays, kaolin and other varieties of clay, together with the manufactured products, including brick and refractory materials; sewer pipe, drain tile, roofing tile, building and ornamental brick, paving brick, pottery and terra cotta; copper, manganese, barite, triopoli, nickel and cobalt, with the various manufactured products; plate glass sand and products; molding sand; road materials with models of roads showing methods of using Missouri materials in the highway construction; building stones, including limestones, sandstones, granites, porphyries, onyx and marble, in cut and polished cubes and slabs; mineral waters and a representation of a Missouri artesian well; hydraulic cement; lime; pearl buttons; zinc and lead concentrates; iron pyrites. Together with these materials there were exhibited a very large collection of strikingly handsome crystal specimens of many varieties, and also an exhibit of pig ore, pig lead, copper and zinc spelter.

The second idea, or that of attracting the attention of people to our exhibit, was developed by the introduction of moving features, which, so far as possible, were made not only attractive, but educational, and an illustration of processes used in the preparation of Missouri ores for market.

The features which might be included in this class are as follows: An elevated double track railroad, which surrounded our entire space, and upon which there moved six miniature freight trains, each thirty-two feet in length, and representing the important railroad systems of Missouri, hauling the ores which occur in their respective territories. This feature proved tremendously attractive.

Second—A moving train of thirty cars loaded with various mineral products of the State, circling in part, beneath the floor of our space and rising through an aperture about thirty feet in length to the level of the floor, where they passed in endless chain before the spectator.

Third—An automatic working model of a coal tipple, occupying a floor space of twenty-two feet by seven feet, and illustrating the most modern process of hoisting coal from the mines, dumping screening, weighing and delivering the classified produce to freight cars. This feature undoubtedly attracted and held the attention of more people than did any other single exhibit in the entire department of Mines and Metallurgy.

Fourth—A working model of a zinc and lead mill, occupying a floor space of twenty by twenty feet, and showing in every detail the methods of handling our zinc and lead ores. This mill was operated by students of the Missouri School of Mines.

Fifth—A working chemical and assaying laboratory, operated by the Missouri School of Mines, and illustrating various chemical processes which are used in connection with the treatment and testing of our ores.

Sixth—A working magnetic separator, representing the process used in Southwest Missouri of separating the objectionable iron pyrites or mundic from the zinc ores of that district.

Seventh—A moving collection of twelve hundred Missouri mining views; so arranged as to take up the least possible floor space, and at the same time to present an imposing appearance as a collection, while by pressing a button, the observer was enabled to stop the motion and inspect in detail any particular view.

Eighth—An operating rock section machine, together with optical projection apparatus, from the School of Mines laboratories.

In addition to the above features there should be mentioned the exhibit, in the mining gluch, of an operating mining pump, which was invented at the Missouri School of Mines, and which has attracted a great deal of attention to that institution through its remarkable adaptation to many water problems in mining.

Two hundred framed bromide enlargments were also exhibited, while a magnificent pavilion, built of Missouri's ornamental brick, terra cotta

and roofing tile; and a pagoda, which was centrally located and built of Missouri's hydraulic cement, were interesting features of the exhibit. With these features there was a large relief map of Missouri fourteen by sixteen feet, a superb piece of work, made by Prof. C. F. Marbut, of the State University, showing the natural features of the State, the distribution of geological strata, the location of mines, etc.

Our cabinet specimens were placed in about thirty plate glass show cases, specially designed for our exhibit. These cabinets contained more than fifty thousand separate specimens of magnificent character, arranged in the most artistic and attractive manner, carefully labeled as to variety, section and donator, and this illustrated the varied nature and enormous value of Missouri's mineral resources. Every section of the State to a fractional degree was represented in this collection and with statistical information prominently displayed on neatly printed placards, made the important position of Missouri as a mining State plainly apparent to the visitors, besides presenting careful and detailed information in an easy, practical and interesting manner. The entire exhibit was surrounded by a very handsome brass railing, with brass posts, specially designed.

If the object of our exhibit was to widely advertise the fact of the importance of Missouri's mineral resources, the claim can safely be made that the exhibit was a success: for from the beginning to the end of the Exposition period, our space was thronged with visitors, and there were not many days when the visitors actually, on our space, could not be numbered in the thousands."

For the success of the exhibit, we are indebted to the intelligent and conscientious efforts of Dr. George E. Ladd, who served as Superintendent for this department, and we are also under the greatest obligations to the employees and assistants, who, almost without exception, worked with unflagging interest and zeal for the success of the exhibit. We are glad, also, to acknowledge obligations to the mining men and producers in all the sections of the State, for aid in furnishing specimens, and for their cordial support."

DEPARTMENT OF FORESTRY.

"In the east end of the Forestry building the State made a creditable exhibit of its timber and timber products. Fine specimens of the following named Missouri timbers were shown in this exhibit, viz.:

Yellow Pine,	Soft Maple,	Mulberry,
Beech,	Birch,	Hickory Maple,
Hickory Elm,	Striped Maple,	Poplar Elm,
Red Hickory,	Elm,	Persimmon,
Black Willow,	Dogwood,	Hackberry,

Sugar Maple,	Hickory,	Cucumber.
Box Elder,	Red Oak,	Willow Oak,
Red Locust,	Red Elm,	Ash,
Swamp White Oak,	Red Gum,	Sycamore,
Poplar,	Black Gum,	Walnut,
Cherry,	Tupelo Gum,	Paw Paw,
Pecan,	Cypress,	Catalpa.
White Oak,		

A large display was also made of finished woods, such as yellow pine, white oak, ash and other hard woods. But the best and most attractive exhibit was that of the gum lumber of Southeast Missouri. Here were columns, panels, doors, door frames, mantels, window frames, pilasters, furniture and other architectural creations fashioned out of this red gum lumber and polished and finished in the most artistic manner. The beauty and finish of this lumber was a revelation to the world and will no doubt make a greater market and a much higher price for this large lumber production of Southeast Missouri. There was also on exhibit staves, hoops, spokes, handles, hubs and similar manufactured articles. This whole forestry exhibit was made in a handsome booth, constructed wholly of finished Missouri lumbers."

FISH AND GAME.

Missouri Bountifully Supplied with Fish.—The great river systems of the State provide a great variety and abundant supply of fish. The Mississippi river washes the entire eastern boundary of the State, the Missouri traverses the State from the extreme northwest diagonally across to the east central part, together with the Osage, St. Francois, Little Current, Grand, Gasconade and numerous smaller streams within the State, furnish a goodly supply of the following varieties: catfish, buffalo fish, crappie, black bass, German carp, drum, hickory shad, pike, perch, mooney, eels, rock bass, sturgeon, suckers, sunfish, white bass, turtles, frogs and mussel shells.

People Employed.—There are 1,531 people employed in commercial fisheries with an invested capital of $645,671, yielding an annual output of 7,551,442 pounds, valued at $211,301.

Game.—Missouri's great diversity of climate, forests, plains and mountains naturally afforded a home for many wild animals, many of which have become very rare under the civilization influences, and with some species entirely extinct. In the Ozark region an occasional black bear or mountain lion is encountered as also the wild cat, once so common in that section. In a few of the southern counties the Virginia deer is still found, though in comparatively few numbers. The red fox, the raccoon, the opossum, the cotton tail or rabbit, the grey and fox squirrels, the

ground hog are found in nearly all the counties of the State. Song and insectivorous birds are in great abundance and varieties in Missouri. Wild geese and ducks are plentiful on the lakes and rivers. The bob white or American quail is the favorite game bird and is found in every county, and with the present game laws rigidly enforced, should increase in numbers. The wild turkey is yet found in many of the southern counties, and occasionally a wild pheasant. A few prairie chickens are still found in the western part of the State, although this bird once so numerous is almost extinct.

The following description of the fish and game exhibit is from the report of the Missouri Commission:

DEPARTMENT OF FISH AND GAME.

"In the east end of the Forestry, Fish and Game building and adjoining the forestry exhibit, the State made a good fish exhibit. There were installed twelve first-class plate glass aquariums around a central artificial pool in the floor of our space. These aquariums and this pool were kept stocked with all varieties of Missouri fish during the period of the Exposition. Just west of the Forestry, Fish and Game building, the State installed an out-door live fish and game exhibit. In this Missouri was conspicuous because this exhibit was the only one of the kind within the World's Fair grounds. In the center was built a small lake, stocked with Missouri fish, and about this lake was constructed appropriate cages in which was assembled the several varieties of live game of the State. Here was shown deer, bear, mountain lions, wild cats, wolves, coyotes, foxes, raccoons, opposums, skunks, squirrels, wild turkeys, wild ducks, wild geese, quail, pheasants, owls, eagles and other wild game.

At one end of the lake was constructed a model hunter's lodge, which appealed to the sportsmen visitors at the Fair. It was built of cypress logs, sawed lengthwise through the center, so as to give the building the appearance of a log house on the outside, but make the interior surface smooth. In it was shown, in very handsome cases, a fine collection of mounted game, birds and animals and other taxidermy. The decorations of the lodge were hunters' trophies—guns, fishing tackle, camping equipment and similar articles attractive to all true sportsmen. The current sporting papers and magazines were received and read here and about its tables and within its suggestive surroundings many a story of the gun and rod was recounted to the pleasure and entertainment of our visitors. Thus, it was hoped that, aside from the mere exposition feature of this exhibit, it might inspire our own peo-

ple to insist upon better State laws for the protection and preservation of our fish and game."

EDUCATION IN MISSOURI.

School Enumeration and Enrollment.—There are all told 974,923 children of school age—6 to 20 years—in the State. Of this number 780,-541 are enrolled in the schools. For the instruction of these children there are employed 20,166 teachers, of whom 16,923 are in the public schools, 185 in the State University and State Normal Schools, 1,417 in private colleges and academies and 1,551 in parochial schools.

Number of Schools.—A school is in easy reach of every man's door, and opens with equal privileges to rich and poor. There are 9,119 rural school districts, and 613 town or city districts. There are 10,393 teachers in rural schools and 6,530 in town and city. There are 482,284 children enumerated in the rural schools and 492,639 in town and city.

Money Expended.—Missouri has the largest permanent productive school fund of any state in the Union. The sum of $13,023,997 is invested in securities, the proceeds of which help to defray the current expenses of the schools. The legislature annually appropriates one-third of the State revenue for support of the public schools. In addition to the above, the districts levy an annual school tax which averages for all the schools 57 cents on the $100 valuation. Missouri has school property valued at $42,600,117, and expends annually for her schools the enormous sum of $10,959,828.

Illiteracy Low in Missouri.—In 20 years the percentage of illiterates in the State had fallen from 13.4 in 1880 to 6.4 in 1900, a decrease of 7 per cent, while in the United States for the same period the decrease was only 6.3 per cent. In the United States the percentage of illiterates in 1900 was 10.7, while in Missouri it was only 6.4.

The following quotation from the report of the Missouri Commission gives a good description of the Missouri educational exhibit at the World's Fair:

THE STATE EXHIBIT.

"The Missouri educational exhibit was conspicuously located directly within the main entrance to the Palace of Education. It was divided into three sections, viz.: The general State exhibit, the St. Louis city exhibit and the State University exhibit. This whole exhibit covered nearly ten thousand square feet of floor, and in size, beauty and attractiveness of installation and high quality of exhibits, outranked the educational exhibit of every other state.

The general State exhibit, thirty feet wide by one hundred and forty feet long, was surrounded by an exquisite facade in old English oak, consisting of twenty-two Romanesque arches, whose pillars and spandrills gave lodgment to nearly four thousand transparencies of noted Missouri educators, Missouri school buildings, school scenes and school children. Beginning with the Kindergarten a separate booth was set apart for the particular work of this and each of the twelve grades or years of school work provided in the school system of Missouri. All written work was bound into beautiful half-leather bound volumes of uniform size, and so named, lettered and indexed that the work of any child, in any branch, could be located in a moment's time. This written work came from all the primary high schools of the towns and cities of the State, and from the rural districts in every section of the State. Countless samples of all kinds of the best work of pupils of each grade was shown in two hundred of the most modern style of wing frame cabinets and cases. The manual training work of each grade was most attractively presented in glass-covered cases, specially designed for this exhibit and placed at the entrance to each grade booth. County maps, free-hand drawing, water-color pictures and a great variety of all forms of school work were shown in handsome portfolios, elegantly bound in leather. Many thousands of photographs, of school buildings, with teacher and pupils in the foreground, and in many cases such included all the schools of a county, were shown in wing-frame cabinets. The negro schools of the State were fully represented by a complete exhibit of their school work in every department. Besides these thirteen booths for the educational display of the primary and high schools of the State, there was ample space upon which was shown a matchless exhibit of the work of the Kirksville Normal School, the Cape Girardeau Normal School, the Warrensburg Normal School and Lincoln Institute at Jefferson City, and also of the following prominent colleges and academies of the State, viz:

Missouri Valley College, Marshall.
Park College, Parkville.
William Jewell College, Liberty.
Hardin College, Mexico.
Drury College, Springfield.
Christian College, Columbia.
Howard Payne College, Fayette.
Central Female College, Lexington.
Kemper Military Academy, Boonville.
Westminster College, Fulton.
Liberty Ladies College, Liberty.
Central College, Fayette.
Central Wesleyan College, Warrenton.

But the feature of this exhibit that attracted the greatest number of visitors were two graphophones and seven mutoscopes or biogems. The graphophones constantly sang school songs, discoursed recitations

and other actual oral school work, taken on numerous records in the best schools of the State, and the display was highly appreciated and generously applauded by a continuous audience of visitors. The seven biogems presented at all hours of the day daylight moving pictures of physical training exercises and games as are taught in the best schools of the State. These pictures were taken mostly in the public schools of Kansas City, but some were taken in the public schools of St. Joseph, in the State Normal School at Kirksville and in the Missouri Valley College at Marshall. These pictures were taken at large cost by an expert from New York City, and were pronounced by the American Mutoscope and Biograph Company of New York City to be the best of the kind ever made and ones that would without doubt cause a sensation among the educators of the country.

With all these diverse, attractive, entertaining and superior educational exhibits shown in a beautiful and artistically illuminated facade that seemed a realization of Fairy Land, it is not strange that this wonderful educational exhibit of the school resources of Missouri set a new standard for the standard of education. Passing by the conventional educational exhibits of the other states, the great throng of teachers and other World's Fair visitors fairly swarmed into the Missouri exhibit space until it was usual to have ten thousand visitors in a single day.

ST. LOUIS EXHIBIT.

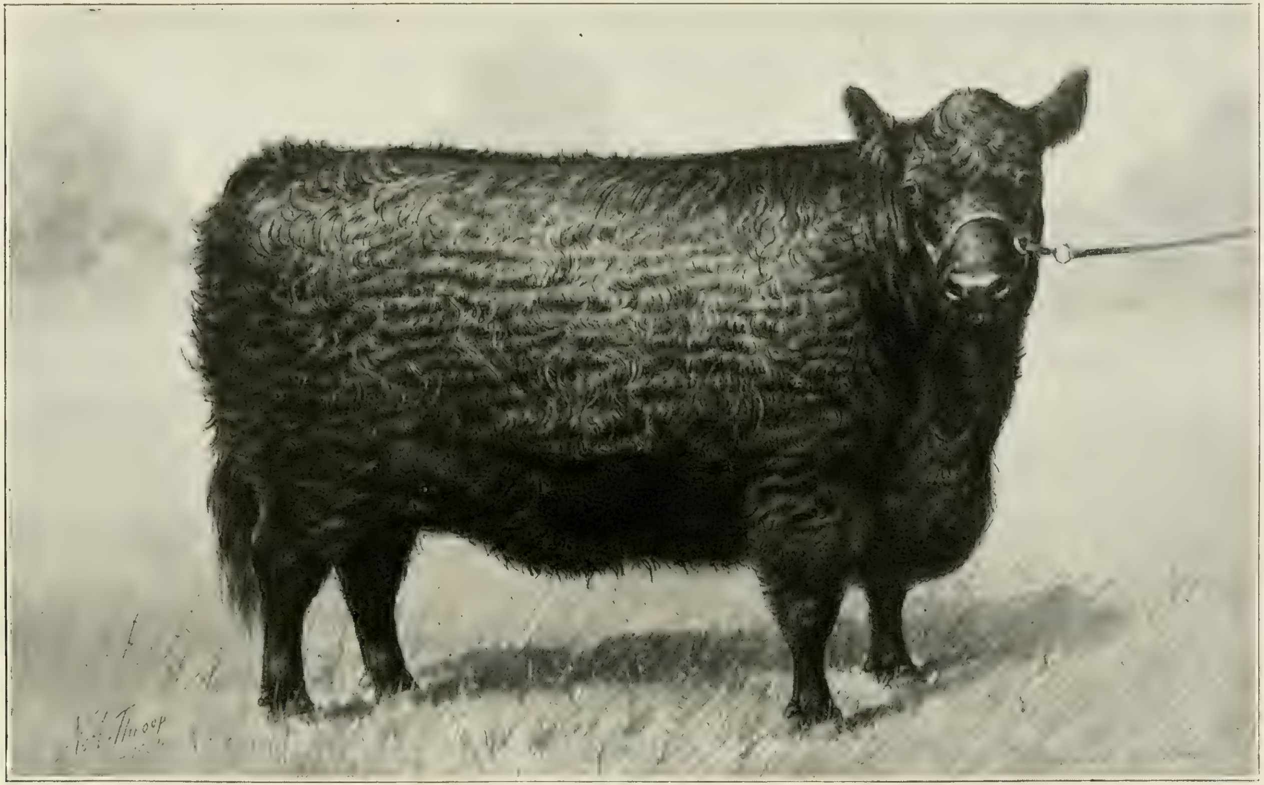
"The special exhibit of the public schools of the city of St. Louis was made under the direction of its superintendent of city schools, F. Louis Soldan, with the assistance of Assistant Superintendent Carl Rathman, and other teachers. The expense was borne by the city of St. Louis.

This exhibit occupied a space of twenty-seven feet wide by one hundred and forty feet long, and adjoining the general State educational exhibit. It was installed with a facade of the same architecture and character as the State exhibit above described, and the two exhibits separated by a twelve-foot aisle. The sixteen columns of the facade contained panels showing sixteen transparent paintings, representing a history of the development of education. There were transparent photographs of school children, buildings and class exercises; wall cabinets containing a great variety of selected specimens of pupils' school work; manual training work, collections of mounted birds, of minerals, of fossils, of butterflies, etc., and many other interesting exhibits of school work. These exhibits were full and complete as to all the grades, including the high school. The popular feature of this exhibit was a model school room in which actual school room work was

done every day in the week, except Saturday. Classes from the various St. Louis schools under the skilled direction of the teacher here presented a true and vivid picture of the efficiency, methods and discipline of their teachers and the splendid results accomplished in their schools.

STATE UNIVERSITY EXHIBIT.

"The State University exhibit, constituting the third section of the Missouri Educational Exhibit, adjoined the other two sections on the west and occupied more floor space than any other university. The exhibits shown on this space may be divided into two classes: Those which showed what the University has been and is, and those which showed what the university is doing. The center of the University space was occupied by the original monument from the grave of the immortal Thomas Jefferson. Made in accordance with the written specifications of this great patriot himself, it stood over his last resting place until 1883. Then it came as a gift to the State University of the greatest State carved from the Louisiana Purchase. Since Jefferson was the father of the State University in America, it was deemed most fitting that this monument should form a unique part of the exhibit of the University at the Louisiana Purchase Exposition. To show what the University has been and is, a series of six water-color bird's eye views were prepared representing the buildings and grounds at Columbia as they appeared in 1843, 1873, 1892, 1895 and 1904. These views were supplemented by a similar bird's eye view of the School of Mines at Rolla as it appeared in 1904. In the first six mentioned the slow progress of the development from 1843 to 1892, and the rapid changes in the years 1892-1904 were strikingly portrayed. A series of charts showing at these same periods the condition of the University in number of students, number of instructors, in endowment, in value of property, in annual income, demonstrated that the growth of the University in the last twelve years has been remarkable in every way. A series of fine photographs of exteriors and interiors helped to bring the University of to-day before the eyes of the World's Fair visitor. Foremost among the many fine models shown at the Exposition stood the model of the campus of the University. It was on a scale of 1 to 100, about 10 by 16 feet in size, and is perhaps the finest piece of work that has come from the hands of George Carroll Curtis of Boston, the geographical sculptor who first won fame by constructing the models of Washington now in the National Library. This model, naturalistic, not conventional, in its treatment, was accurate to the last degree in measurement, in form and in color. Thirty-five departments united in showing what the University is actually doing in their several lines.



EVALINE 2D OF AVONDALE 20124.

Galloway Grand Champion female, St. Louis World's Fair, 1904. Owned and exhibited by C. N. Moody, Atlanta, Mo.

They showed the discoveries, inventions, processes and products made by teachers and students. Of the publications of the Univerisity which were on view, the most important portion was the exhibit by the law department of a complete set, elegantly bound, of all the legal publications of those who have been connected with the law school as teachers or students. In the same case were placed a complete series of official publications of the University and an incomplete series of publications by members of the faculty. In Roman languages a chart of phonetic tracings showed some of the original work of Dr. Raymond Weeks, and a Victor talking machine indicated the method of instruction employed in teaching these languages. Certain phases of this work in progress in the department of mathematics, astronomy, physics, physiology and internal medicine were all represented. The department of agriculture, better represented elsewhere in the exhibits of Missouri and of the Federal government here, showed the result of experiment in cattle feeding, in the winter protection of the peach, and in winter raising of asparagus in the open field. The most important display in veterinary science was concerned with Dr. Connoway's experiments in Texas fever. The department of engineering, in addition to many plans and drawings, exhibited the results of practical tests of the properties of wood, steel, belts, ropes and lubricating oils, extensive experiments in the caloric value of many varieties of coal, machines invented in the laboratories and complete plans for a power plant at the University. The work in physical training was portrayed by means of many original charts and record blanks, by numerous photographs of the gynasium, of classes of teams and of athletic events. In experimental psychology, Dr. Max Meyer's theory of music was illustrated by the unique organ invented by him. This department further exhibited an original piece of apparatus illustrating the process of hearing. Missouri history was graphically represented on a series of maps. The department of political science and public law showed the development of county organization in the State. The department of history made clear the distribution over the State of political parties at all the presidential elections in which the State has taken part. The department of economics, in connection with other phases of economic history, made clear the part played by rivers and railroads in reaching and in increasing the resources of the State. Another series of maps showed sociological process, problems and conditions. In certain departments of science, Missouri received still further attention. Entomology dealt with Missouri insects, both the helpful and the baneful. Botany discussed certain Missouri flora and dealt particularly with original plans for mushroom culture. Zoology, besides a fine array of Missouri fauna and original

methods of mounting specimens, offered an interesting exhibit of the lower form of animal life in the State. Chemistry showed specimens and the analysis of the water furnished to the public in fifty cities and towns. In the department of anatomy and histology was portrayed the method invented by Dr. C. M. Jackson for the study of topographic anatomy by means of prepared and mounted sections of the human head and trunk. Most notable of the departmental exhibits was the great relief map of the State, made by Professor C. F. Marbut of the department of geology and his students. Five copies of the map were to be seen at the Exposition. One in the Agricultural College exhibit was colored to show the agricultural resources and products of the State. In the Horticultural exhibit the map showed the fruit soils of Missouri. In the Missouri building it was a general geographical and political map. In the exhibit of Mines and Metallurgy, the map displayed the mining interests. In the University exhibit, the geological formations of Missouri were most elaborately and carefully represented. In the preparation of the maps, not only were all published sources of information carefully studied, but the results of Professor Marbut's years of patient work in the field of every portion of the State were used to the full. The Missouri University exhibit was made under the direction of a committee of the University, consisting of John Pickard, chairman; H. J. Waters, I. Loeb and H. B. Shaw. The University booth was built in accordance with plans suggested by John Pickard. The installation and care of the exhibits throughout the Fair was also in the hands of Mr. Pickard, with T. K. Smith as assistant. The display far excelled that of any other university. It was the testimony of competent foreign and American critics that never at any exposition had any university made so superb a showing.

SOCIAL ECONOMY EXHIBIT.

"In the Palace of Education, Missouri also made an exhibit in the social economy section, thoroughly showing the work of the Boys' Training School at Boonville, the Industrial School for Girls at Chillicothe, the School for the Deaf and Dumb at Fulton, the School for the Blind at St. Louis, the Hospitals for the Insane at Fulton, St. Joseph, Nevada and Farmington, the Colony for the Feeble-Minded at Marshall, the Federal Home at St. James and the Confederate Home at Higginsville. The new City Hospital at St. Louis was shown by a fine plaster model, and the work of the State Board of Charities and Corrections and the State Labor Bureau were attractively presented. The Missouri exhibit of the education of defections, as presented by the Missouri Deaf and Dumb School and the Missouri Blind School, were

pre-eminently the star features of this department. During the most of the Exposition period, both the schools kept classes of their regular pupils in the model school rooms in this department, doing the actual school work for the education of the deaf and dumb and blind. This work always attracted a large crowd and brought great credit and distinction to Missouri.

MODEL RURAL SCHOOL HOUSE.

"Another important and unique exhibit of the Missouri Educational department was the model rural school house, which stood in a beautiful grove near the Art building. The modern, model, up-to-date rural school house was represented by this neat wooden building, containing a school room, cloak rooms, toilet rooms, basement, all well lighted, and with as good system of water service, ventilation and furnace heating as can be found in any city building. This building is so constructed as to cost but slightly more than the ordinary rural school house, and its advantages were so patent and so highly commended by teachers, school officers and educators who saw it that the Missouri Commission had printed and distributed a pamphlet containing the elevations and complete plans, details and specifications for the construction of such model rural school house, and we have the assurances that many of these school houses will be built in Missouri within the next year. The state superintendents of three other states have asked permission to use these plans in the construction of rural school houses in their states, and State Superintendent Riggs of Iowa has sent out a pamphlet urging the adoption and use of these plans by the school authorities of that state.

The whole department of Education was under the direction of Commissioner J. H. Hawthorne of Kansas City, Missouri, and the organization, installation and care of the exhibit was under the supervision of Professor George V. Buchanan of Sedalia, Missouri, superintendent of this department.

The World's Fair awards made in the Department of Education were as follows:

Grand prizes, 26; gold medals, 51; silver medals, 59; bronze medals, 22. Total, 158. Of these, 70 were to the General State Educational exhibit, 44 to the State University, 25 to the St. Louis city schools, 8 to St. Louis University, 5 to Washington University, 1 to Christian Brothers' College and 1 to Forest Park University."

A GOOD RECORD.

No state surpassed or equalled Missouri anywhere. The cost of the various exhibits and the detailed statement of the expenditures of the

Commission are shown in the official report of the Commissioners. The appropriation by the State was a million dollars. The expenditures in the departments were: Agriculture, $78,039.24; Horticulture, $51,103.-86; Education $53,888.17; Mines and Metallurgy, $57,670.47; Live Stock, (including poultry), $95,158.24; Forestry, $9,298.85; Fish and Game, $12,754.81; Dairy, $10,190.29; Missouri Building expenses, including cost of maintenance, $232,918.16; general expense, $176,949.30. So well were the funds managed that $200,000 of the total appropriation of one million dollars was returned to the State treasury.

THE AWARDS MADE TO MISSOURI.

WORLD'S FAIR, ST. LOUIS, 1904.

(From Report of Missouri Commission.)

"Missouri won in competition with the world, 2,437 awards. These were given by international juries after consideration of competing exhibits from every state, territory and foreign nation represented. The provisional list of awards, of which the accompanying list is a copy, shows that Missouri received 53 grand prizes, 195 gold medals, 408 silver medals and 379 bronze medals, a total of 1,030. In addition, 790 awards to exhibitors of live stock and 617 to exhibitors of poultry made the grand total of awards for exhibits made by the Missouri World's Fair Commission, 2,437. This, of course, does not include the awards to individual exhibitors, firms and corporations, of which many were won by Missourians. This provisional list is only for the State exhibits and those made under State direction by the Missouri Commission. By departments the awards were: Agriculture, 298: grand, 10; gold, 50; silver, 115; bronze, 123. Horticulture, 372: grand, 2; gold, 17; silver, 158; bronze, 195. Education and Social Economy, 158: grand, 26; gold, 51; silver, 59; bronze, 22. Mines and Metallurgy, 158: grand, 9; gold, 69; silver, 59; bronze, 21. Woman's Work, 38: grand, 1; gold, 5; silver, 14; bronze, 18. Fish and Game, 6: grand, 2; gold, 3; silver, 1. Dairying, 2; grand, 1; silver, 1. Publications, 4; grand, 2; gold, 1; silver, 1."

IN THE DEPARTMENT OF AGRICULTURE.

Grand Prizes, 10; Gold Medals, 50; Silver Medals, 115; Bronze Medals, 123. Total, 298.

GRAND PRIZES.

P. L. Long, New London—Varieties of grasses.

Missouri Commission—Display of grains.

Missouri Commission—Collective exhibit of grains, agricultural machinery, wool, cattle feeding experiments.

Missouri Commission—Oats, wheat, alfalfa, rye, millet, flax, blue grass, timothy, spelt, English blue grass, Kentucky blue grass, white clover, red clover, meadow fescue, red kaffir corn, white kaffir corn, broom grass, sorghum seed, hemp seed.

Missouri Commission—Model of St. Joseph stockyards.

Missouri Commission—Pop corn, navy beans, sunflower seed, cow peas, soy beans, buckwheat, castor beans and black oats.

Missouri Commission—Melons and cantaloupes, corn, cob-pipe corn.

Missouri Commission—Display of corn.

University of Missouri, Experiment Station—Display showing sixty-five varieties of wheat and grasses.

University of Missouri—Agricultural map.

GOLD MEDALS.

Corn.

J. F. Archer, Walker.
J. H. Castin, Grant City.
Josiah Cravens, Arbela.
J. W. Denton, Buckner.
Hall Goodrich, Calhoun.
Theo. Huebner, Bem.
Turner Long, Fayette.
T. W. McFarland, Boonville.
Geo. W. Seyt, Kahoka.
Luther Bromley, Maysville.
H. C. Crain, Elmo.
R. F. Dawson, Sheridan.
R. A. Gamble, Galena.
A. F. Howden, Skidmore.
Wm. Laswell, Canton.
Brack Martin, Napton.
C. O. Raine, Canton.
B. Zadoc, Shelbyville.

Wool.

Chenoweth Bros., Lathrop.
D. F. Hall, Killwinning.
J. E. Muir, Callaway.
Eva C. Roby, Rocheport.
University of Missouri, College of Agriculture.
Hopson Glasscock, Oakwood.
S. F. Huntsman, Cairo.
H. M. Oliver, Fulton.
J. E. Shattuck, Stanberry.
E. B. Wilson, Stanberry.

Wheat.

Elery Boles. Lebanon.
Thos May, Knobly.
Henry Depky, Rockport.

Miscellaneous.

Artistic Display of Corn and Grain—Missouri Commission.
Timothy—L. F. Noah, Bethany.
Timothy—J. Skillman, Platte City.
Chemical Analysis of Grains—University of Missouri Experiment Station.
Alfalfa—J. W. Gaither, Hayti.
Ginseng—A. L. Leavitt, Houston.
Watermelons—Mississippi county.
Watermelons—Scott county.
Grain—Nuss & Son, Tina.
Collection of Vegetables—Missouri Commission.
Cider—Clarksville Cider Co., Clarksville.
Clover—W. J. Davis, Lockwood.
Clover—M. N. Finnerty, Briscoe.
Grasses—Ira Darby, Fayette.
Vinegar—Clarksville Cider Co., Clarksville.
Ginseng—Douglass E. McDowell, Joplin.
Sorghum—R. J. Melton, Damon.
Cabbage heads—H. Meyer, Wellston.

SILVER MEDALS.

Corn.

W. D. Baker, Kennett.
R. Bilyew, California.
J. N. Bohannon, Agnes.
J. L. Carpenter, Mexico.
Herman Duise, Hillsboro.
Jas. Ellison, Beaver.
A. J. Flint, Bethany.
Herman Gauschoe, Willow Springs.
J. W. Ginn, Butler.
Peter Guentner, Harrisonville.
Patton Hayter, Centertown.
J. W. Herbert, Wheatland.
Hollyman Bros., Palmyra.
G. W. Kruss, Baxter.
A. J. Love, Kirksville.
C. T. Marsh, Warsaw.
Marion McVey, Brice.
Geo. Parker, Louisiana.
John E. Pearson, Fayette.
Mason Redding, Finney.
J. K. Rutledge, Fordland.
Geo. H. Sly, Rockport.
W. E. Woodsmall, Marshall.
Geo. F. Bennett, Patterson.
Wm. Blankenship, Alton.
B. Bondiver, Louisiana.
J. R. Coram, Ash Grove.
D. H. Egan, Dover.
N. E. Femme, Whiting.
J. H. Foglesong, Lancaster.
C. A. Griessennauer, O'Fallon.
C. Hance, Arlington.
John Hayward, DeKalb.
E. A. Hibler, Steelville.
Hiram Howard, Marshall.
K. Lecompte, Cassville.
Lawrence Maisel, Millville.
J. E. Matheny, Miami.
J. W. Null, Dongola.
H. C. Parker, Kidder.
John Peck, Rushville.
Geo. Reed, Eagle Rock.
R. E. See, Montgomery City.
E. Tucker, Perryville.

SILVER MEDALS—Continued.

Wheat.

Cooper county.
DeKalb county.
Perry county.
Taney county.
E. C. Buckner, Lee's Summit.
D. Hoover, Lee's Summit.
Chas. Kuepel, Defiance.
Rae-Page Milling Co., Marshall.
Howard Cabbe, Ash Grove.
Dade county.
Madison county.
Franklin county.
St. Louis county.
E. A. Alginson, Montgomery City.
J. B. Buss, St. Louis.
Ami Hughes, Lexington Junction.
Fred Malinken, New Madrid.
L. N. Thorley, Montgomery City.
Max. Waphorst, Valley Park.
August Roth, Wittenberg.

Potatoes.

G. Brumner, Mayview.
H. Strucktmeyer, Mayview.
Dent county.

Timothy.

Coontz & Waters, Vandalia.
Dunlap Bros., Breckenridge.
John and Woods Hall, Marshall.

Pumpkins.

J. H. Plackemeier, St. Charles.
T. C. Sareter, St. Charles.

Clover.

B. H. Neal, Greenfield.
G. M. Tucker, Blodgett.

Clover Seed.

Herman Feith, Higginsville.
Hensley & Sailer, Montgomery.

Wheat and Clover.

Wm. Reed, Sedalia.

Vegetables.

Dent county.
St. Louis Seed Co., St. Louis.
Wm. Coen, Lexington.

Watermelons.

Dunklin county.
B. F. Marshall, Blodgett.
Stubbs-Marshall Mercantile Co., Blodgett.
J. D. Green, Blodgett.
Max. L. Ostner, Diehlstadt.

Wool.

J. W. Boles, Auxvasse.
Elmer Frazier, Maryville.
O. C. Roby, Rocheport.
W. J. Turner, Shelbyville.
G. B. Bothwell & Son, Breckenridge.
Harry McCullough, Fayette.
Standard Ranch, Unionville.

Squashes.

Alfred Amor, Blue Stem.
L. M. Crabill, Ewing.
Thos. C. Baily, Lexington.

Squashes and Beets.

Chas. Truebner, Lexington.

Miscellaneous.

Cabbage—Louis W. Burgett, Tandy.
Jellies—Ida M. Munich, Rockport.
Cucumbers—Missouri Bontanical Garden, St. Louis.
Corn Towers—Missouri Commission.
Missouri Girl, Indian Girl., etc., in Grains—Missouri Commission.
Sweet Potatoes—Andrew S. Reeder, Sappington; H. Schnell,. Glasgow.
Grass—John R. Carson, Palmyra; State of Missouri.
Asparagus—Chas. Hoekler, St. Louis.
Extracted Honey—Missouri Commission.
Millet—Laclede county.
Flax Seed—A. Kohler, Harrisonville.
Ginseng—Ozark Ginseng Garden, Houston.
Peppers—J. C. Rudder, Affton.
Sorghum—W. N. Harter, Laclede.
Wines—Wm. Aull, Augusta; Otto Fuln, Augusta.

BRONZE MEDALS.

Corn.

J. Kiso, Freedom.
S. O. Langdon, Osceola.
Caleb Mathews, Oran.
W. G. Mays, Lelia.
J. A. McGinnis, Selmore.
H. Mische, Charrette.
G. T. Morton, Alley.
J. R. Page, Lexington.
L. D. Patterson, Paris.
Benj. Pikey, Conrad.
H. A. Schoppenhorst, Peers.
D. F. Strahlman, Libertyville.
S. J. Tune, Eden.
J. H. Wood, Cordz.
W. M. Baker, Liberal.
J. O. Bassett, Vienna.
Bennett Fruit Farm, Neosho.
Geo. Calkins, Ironton.
Oscar Connor, Gainesville.
Geo. E. Edwards, Mackarat.
J. H. Fowler, Green Briar.
R. E. Galloway, Forsythe.
F. E. Goodnow, Kingston.
R. D. Hirst, Rando.
J. T. Huffaker, Coy.
Levi Jocobi, Columbus.
H. L. Johnson, Atlanta.
Wm. J. Jones, New London.
Wm. Kellar, Salisbury.
G. M. Klenger, Fair Grove.
Henry Marr, Lickney.
Dena Mayberry, Van Buren.
J. W. McDaniel, Rutledge.
Lawrence Mesel, Millville.
Louis Moore, Lewisville.
W. A. Moss, Spring Hill.
C. M. Pannebecker, Poplar Bluff.
Edward Perringer, Madison.
H. E. Scanland, Minneola.
R. L. Snyder, Idalia.
J. S. Tenney, Lentner.
John Vandril, Latan.

BRONZE MEDALS—Continued.

A. J. Alexander, Pittsburg.
L. F. Baskett, Browning.
G. W. Bell, Black.
A. C. Boulden, Northsville.
W. D. Cantrell, Duncan.
T. W. Crawford, Boynton.
J. C. Finch, Hobson.
Fulton Sun, Fulton.
T. C. Gooch, Briar Brook.
B. F. Hamilton, DeLassus.
A. Hollingsworth, Carthage.
Wm. Illers, Cape Girardeau.
Richard Jennings, Mt. Vernon.
J. J. Jones, Glensted.
Geo. Keith, Edina.
E. S. Kincaid, Lathrop.

Corn Stalk.

Tucker Plant Breeding Farm, Blodgett.

Wheat.

H. W. Adamson, Rockport.
E. M. McGruder, Burr Oak.
Washington Flour Mill Co., Washington.
Gom & Francis, Lexington.
J. W. M. Palmer, Elsberry.

Potatoes.

Gibson & Ward, Irondale.
Alfred G. L.' Hollandt, Cattawissa.
John Steiger, Ravenwood.
Orville Wilhyt, Maryville.

Pumpkins.

Nana Barre, St. Louis.
E. F. Neer, Lexington.
C. G. Lyon, Page City.
W. M. Scaggs, Idalia.

Sweet Potatoes.

Geo. W. Bradley, Jr., Doniphan.
A. G. Morrison, St. Louis.

Peppers and Sweet Potatoes.

Henry Crecelius, Mehlville.

Sweet Potatoes and Beets.

Geo. Trail, Lexington.

Watermelons.

E. Abshire, Diehlstadt.
Ed. Albright, Bertrand.
G. W. Briant, Morley.
W. M. Forester, Diehlstadt.
F. A. Griggs, Morley.
J. Joplin, Eureka.
S. P. Rollins, Diehlstadt.
P. R. Williams, Morley.
Ed. Albright, Bertrand.
F. L. Anderson, Morley.
N. Dabbs, Morley.
S. S. Grant, Morley.
J. D. Huey, Blodgett.
Harry Pelerian, Bertrand.
Sikes & Jacobs, McMullin.

Turnips and Watermelons.

Jos. Williams, Lexington.

Wool.

J. M. Bisel, Rushville.
Elk Hill Stock Farm, Koping.
Wm. Wallace, Madisonville.
C. B. Rothwell & Son, Breckenridge.
Jas. Miller, Granger.

Miscellaneous.

Cob Pipe Corn—Thomas B. Campbell, Lexington.
Rye—Adkisson Bros., Billingsworth.
Radishes—Ben Coen, Lexington; O. Grady, St. Joseph.
Sorghum Molasses—John E. Eckley, Stephen's Store.
Broom Corn—T. Cully, Lamonte.
Timothy Seed—W. H. Hamilton, Gallatin.
Turnips and Watermelons—Jos. Williams, Lexington.
Cabbage—Anthony Schnihr, Norborne.
Wines—Alfred Naha, Augusta.
White Oats—J. F. Slonson, Skidmore.
Bees—E. J. Troy, St. Louis.
Blue Grass, Blades and Stems—S. R. Walker, Liberty.
Timothy Hay—Mrs. R. P. Bland, Lebanon.
Beets and Peppers—Henry Heidman, Central.
Spelt—Andrew county.
Onions—Lew Coen, Lexington.
Red Onions—A. J. Householder, Lexington; Mrs. Jos. Kirt, Lexington.
Cantaloupes—Howell county; Chas. W. Eno, Lebo.
Red Oats—Jackson county.
Grape Brandy—Mt. Pleasant Wine Co., Augusta.
Rhubarb Stalk—Geo. Root, Canton.
Cotton Seed, Gensing—State of Missouri.
Tobacco—State of Missouri.
Egg Plant—Henry Steinmesch, Kirkwood.

IN THE DEPARTMENT OF HORTICULTURE.

Grand Prizes, 2; Gold Medals, 17; Silver Medals, 158; Bronze Medals, 195. Total, 372.

GRAND PRIZES.

Missouri Commision—Exhibit of Fruits and Nuts. Missouri Commission—Installation.

GOLD MEDALS.

Exhibits of Fruit.

Boone county.
Howell county.
Platte county.
McDonald county.
St. Francois county.
W. C. Gano, Parkville.
D. Lawmiller, Parkville.
Cooper county.
Jackson county.
Laclede county.
St. Charles county.
St. Louis county.
N. W. Thins, Ferguson.
Olden Fruit Co., Olden.
State University, Horticultural Department.

Apples—Missouri Horticultural Society.

SILVER MEDALS.

Apples.

Morgan county.
Texas county.
Newton county.
Pettis county.
Washington county.
Dent county.
Lewis county.
J. F. Marsh, Steelville.
J. W. McAdam, Weston.
J. T. Mounts, Maryville.
T. J. Murphy, Wallace.
L. C. McSpadden, Salem.
J. L. Pelham, Neosho.
G. R. Reynolds, Mountain View.
A. J. Robertson, Elmont.
L. Siechler, St. Charles.
J. L. Staebler, Billingsville.
C. W. Steinman and H. Schulte, Dalton.
B. T. Stewart, Rushville.
M. C. Surface, Kansas City.
Topozark Orchard Co., Sunlight.
E. L. Nance, Lee's Summit.
P. A. Vanvraken, Grain Valley.
J. Wagee, Spring Garden.
L. W. Weed, Bales.
C. R. Worley, Mansfield.
T. A. Atwood, Swedeborg.
J. W. Beatty, Excelsior.
J. M. Bisel, Rushville.
E. C. Butterfield, Blue Springs.
A. H. Chevally, West Plains.
E. R. Clough, Lebanon.
Dr. W. Y. Drace, Keytesville.
Lewis Fetson, Keytesville.
S. F. Fletcher, Lebanon.
H. Gassen, Lexington.
T. G. Henley, Spring Garden.
J. H. G. Jenkins, Spring Garden.
H. Knause, Farmington.
J. W. Ludwig, Grabeel.
Ozark county.
Vernon county.
Nodaway county.
Putnam county.
Wright county.
Holt county.
W. S. Martin, DeKalb.
J. F. Maxville, Parkville.
E. L. Morten, Calumet.
J. F. Murphy, DeKalb.
G. T. Odor, Holt.
Mrs. A. Patterson, Wellston.
C. O. Raine, Canton.
G. W. Roberts, Boonville.
A. Rubbling, Augusta.
L. J. Slaughter, Grain Valley.
David Stanton, Faucett.
J. W. Stevenson, Trenton.
L. Southworth, Sargent.
Dr. J. S. Talbot, Easton.
Henry Trampe, Blackjack.
J. A. Vandeventer, Mound City.
F. Vodt, Goodman.
W. C. Walker, Sullivan.
Isaac Wells, Easton.
J. A. P. Allison, Rushville.
S. P. Bailey, Versailles.
C. C. Bell Fruit Co., Boonville.
M. R. Brommer, Boonville.
C. R. Cartner, Boonville.
J. F. Chiles, Buckner.
R. Daken, Skidmore.
Isaac Elliott, Trenton.
Alex. Fleming, Cuba.
S. H. Graden, Parkville.
Ed. Herriman, Mooresville.
Martin Hurt, Keytesville.
S. L. Kies, Mountain Grove.
G. W. Logan, Logan.

Pears and Apples.

Mercer county.
L. D. Grover, Parkville.
Park College, Parkville.
T. C. Berthold, Bismarck.
C. H. Oetting, Mansfield.
C. H. Shepard, Lamonte.

Apples and Peaches.

Oregon county.
C. W. Cochran, West Plains.
Adelia N. Jackson, West Plains.
O. L. Session, West Plains.
Ripley county.
John W. Hitt & Son, Koshkonong.
J. A. McMaster, Macomb.
A. J. Shabring, West Plains.

Plums and Apples.

Livingston county.
J. L. Stilwell, Doniphan.

Apples and Strawberries.

Johnson county.
F. H. Speakman, Neosho.

Peaches.

Chas. Eisenhorst, Bellefontaine.
W. O. Mather, Oakville.
Ed. C. Luther, Oakville.
New Haven Nurseries, New Haven.

Strawberries.

Christian county.
J. T. Jaynes, Neosho.
E. S. Katherine, Warrensburg.
Geo. Tippin, Logan.
J. E. Hall, Warrensburg.
H. W. Jenkins, Boonville.
J. J. Schaffer, Verona.

Exhibit of Fruit.

Adair county.
Buchanan county.
Carroll county.
Clay county.
DeKalb county.
Grundy county.
Jasper county.
Lafayette county.
Miller county.
Nodaway county.
Putnam county.
Wright county.
Geo. Addis, DeSoto.
J. S. Butterfield, Lee's Summit.
Henry Creecelius, Mehlville.
J. E. Durkes, Weston.
G. S. Homan, Easton.
Alfred Nahn, Augusta.
A. S. Ruber, Sappington.
J. C. Rudder, Affton.
S. R. Walker, Liberty.
H. J. Webber & Son Nursery Co., Nursery.
J. B. Wild & Bros., Sarcoxie.
A. L. Zimmerman, Weatherby.
Barry county.
Bolinger county.
Chariton county.
Crawford county.
Greene county.
Howard county.

SILVER MEDALS—Continued.

Jefferson county.
Lawrence county.
Newton county.
Pettis county.
Washington county.
Franklin county.
M. Butterfield, Farmington.
Hiram W. Cook, Potosi.
M. T. Davis, Easton.
C. P. Harper & Co., West Plains.
J. E. May, LaPlata.
A. T. Nelson, Lebanon.
M. H. Park, Springfield.
C. W. Steiman, Dalton.
S. H. Wayman, Princeton.
L. Sellner, Graney.

Grapes.

John Howe, Pacific.
H. Theime, Springfield.

Berries.

T. C. Salveter, St. Charles.
J. W. Scott, Sullivan.

Miscellaneous.

Peaches and Grapes—Henry Nier, Nursery.
Chrysanthemums—Missouri Botanical Garden, St. Louis.
Grapes and Figs—Missouri Botanical Garden, St. Louis.
Currants—A. J. Hoefer, Jefferson City.

BRONZE MEDALS.

Apples.

Clinton county.
Camden county.
Knox county.
Webster county.
W. H. Allen, Boonville.
W. L. Allen, Boonville.
Mrs. R. P. Bland, Lebanon.
Brandsville Fruit Co., Brandsville.
John Burks, Excelsior Springs.
J. M. Charles, Graham.
A. Clingingsworth, Farmersville.
W. N. Crouch, Wakenda.
S. L. Dart Fruit Farm, Anderson.
J. D. Davis, DeKalb.
Downing & Bestery, Bowling Green.
Frank Eastman, DeKalb.
E. E. Eiler, Weston.
J. L. Finnell, Keytesville.
Callaway county.
Greene county.
Saline county.
Benj. T. Adams, Bristle Ridge.
J. O. Allen, Huntsville.
Jos. D. Barber, Wallace.
Mrs. J. Bland, Spring Garden.
T. S. Carskadon, Dalton.
E. R. Clare, Lee's Summit.
John Conner, Jefferson City.
J. A. Crowley, Lawson.
Mrs. D. Davis, Boonville.
C. A. Dix and A. J. Davis, Jefferson City.
G. W. Dutton, Williamsburg.
N. P. Eckles, Parkville.
H. T. Fath, West Plains.
O. M. Frey, Louisiana.
D. Gibson, Irondale.
L. E. Grisby, Rockport.
L. E. Hammond, Skidmore.
Wm. Herst, DeKalb.
J. W. A. Jenkins and J. H. C. Jenkins, Spring Garden.
S. H. Johnson, Parkville.
Mrs. E. Krumsick, Washington.
J. Lambert & J. H. Murphy, Wallace.
E. L. Mason & Son, Trenton.
F. Martin & F. Taylor, Lamonte.
G. R. Robertson, Marshall.
Simon Rousch, Edina.
M. Schoparsse, Louisiana.
R. W. Smith, Rocheport.
W. J. Sullivan, Doniphan.
Michael Tobin, Maryville.
S. N. VanTrump, Orrick.
West Plains Fuit Co., West Plains.
G. H. Williamson, Utica.
W. J. Wilson, Wakenda.
A. H. Gilkerson, Warrensburg.
J. A. Hobson, Tacoma.
Henry Helpgrove, Oregon.
C. S. Jenkins, Rocheport.
Jack Jennison, Forest City.
W. K. Kavanaugh, Selma Farm.
M. Lathrop, Trenton.
Levi Mank, Cuba.
R. M. Massey, Kearney.
L. A. McCombs, Carrollton.
D. A. Robnett, Columbia.
Benj. Sams, Warrensburg.
Guy Slead, Mansfield.
Adam Stein, St. Charles.
C. Thorp, Aleston.
Henry Utlandt, Lexington.
Wm. Westerfelt, St. Charles.
W. E. Williams, Nevada.
C. R. Williamson, Mt. Vernon.
M. S. Wycoff, Unionville.

Peaches and Apples.

C. J. Samesly, Macomb.
L. P. Snyder, Shaw.
E. C. Evans, Eureka.
Geo. W. Nell, Maryville.
C. J. Sewessly, Macomb.
C. T. Mallinckrodt, St. Charles.
R. W. Mueller, Augusta.

Apples and Pears.

Wayne county.
Wayne County Horticultural Society, Wappapello.

Pears.

A. J. Blanton, Parkville.
Jake Cox, Princeton.
W. M. Meyersick, Union.
Frank Cockrell, Liberty.
Wm. Eime, Cattawissa.
H. C. Shire, Odessa.

Strawberries.

A. Allbaugh, Farmington.
H. F. Brockschmidt, Monett.
G. A. Dietz, Olden.
B. Logan, Logan.
W. S. Luter, Lutesville.
McQueen Bros., Verona.
Ozark Plant Co., Logan.
C. C. Schupback, Chadwick.
W. E. Bower, Monett.
J. H. Christian, Neosho.
R. Jackson, Neosho.
F. Luchrman, Lexington.
Scott McCormick, Monett.
A. W. Orr, Mt. Vernon.
C. D. Schulte, Lutesville.
Chas. Smith, Neosho.

BRONZE MEDALS—Continued.

Grapes.

Gasconade county.
Ed. Kemper, Hermann.
Mt. Pleasant Wine Co., Augusta.
Hermann Grape Nursery, Hermann.
Henry Meyer, Bridgeton.
Henry Wallis, Wellston.

Fruit Exhibit.

Cole county.
E. P. Biggs, Lutesville.
H. Schnell, Glasgow.
Randolph County.
Mrs. Curfman, Maryville.

Plums.

Ed. Bucksath, Dalton.
Flem Harris, Lee's Summit.
J. W. Goode, Boles.
E. Kalinka, Dalton.

Miscellaneous.

Peaches and Grapes—Louise Murtfeldt, Kirkwood.
Cherries and Plums—M. S. Arnold, Liberty.
Pawpaws—J. C. Cobb, Odessa.
Chestnuts—Geo. F. Rorson, Little Rock.
Currants and Gooseberries—Mrs. Montgomery, Maryville.
Peaches and Grapes—Chas. G. Miller, Boonville.
Plums and Pears—Albert Schieler, Odessa.
Raspberries—S. D. Gregg, Independence.
Gooseberries—Linn county.
Persimmons—J. C. Evans, Harlem.

MULE TOPSY.

First prize winner at World's Fair, 1904. Weighs 1,800 pounds. Owned by Wm. A. Elgin, Platte, City, Mo.

PRIZES AWARDED TO MISSOURI EXHIBITORS OF LIVE STOCK AT THE WORLD'S FAIR, ST. LOUIS, 1904, IN COMPETITION WITH THE WORLD, AND DUPLICATE PRIZES PAID BY MISSOURI COMMISSION, ALSO STATE PRIZES WON IN COMPETITION WITH MISSOURI LIVE STOCK.

DIVISION "A"—HORSES, ASSES AND MULES.

CLASS I—STANDARD TROTTERS.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Stallion, four years and over—			
J. G. Callison, Windsor	$30 00	$30 00	$30 00
C. E. Hazzard, St. Louis	....	....	25 00
3. Stallion, two years and under three—			
J. G. Callison, Windsor	75 00	75 00	30 00
4. Stallion, one year and under two—			
C. E. Hazzard, St. Louis	25 00	25 00	
6. Mare, four years or over—			
A. E. Ashbrook, Kansas City	50 00	50 00	30 00
J. G. Callison, Windsor	30 00	30 00	25 00
C. E. Hazzard, St. Louis	....	....	20 00
7. Mare, three years and under four—			
J. G. Callison, Windsor	75 00	75 00	30 00
10. Mare, under one year—			
C. E. Hazzard, St. Louis	40 00	40 00	
23. Four animals, either sex, any age, get of one sire—			
J. G. Callison, Windsor	45 00	45 00	
24. Two animals, either sex, any age, produce of one mare—			
C. E. Hazzard, St. Louis	40 00	40 00	

CLASS III—FRENCH COACH.

1. Stallion, four years and over—			
Wm. McLaughlin, Kansas City	75 00	75 00	
Wm. McLaughlin, Kansas City	40 00	40 00	
2. Stallion, three years and under four—			
Wm. McLaughlin, Kansas City	75 00	75 00	
Wm. McLaughlin, Kansas City	50 00	50 00	
3. Stallion, two years and under three—			
Wm. McLaughlin, Kansas City	75 00	75 00	
Wm. McLaughlin, Kansas City	40 00	40 00	
6. Mare, four years or over—			
Wm. McLaughlin, Kansas City	50 00	50 00	
11. Champion stallion, three years or over—			
Wm. McLaughlin, Kansas City	100 00	100 00	
19. Grand champion stallion, any age—			
Wm. McLaughlin, Kansas City	150 00	150 00	
23. Four animals, either sex, any age, get of one sire—			
Wm. McLaughlin, Kansas City	75 00	75 00	
24. Two animals, either sex, any age, produce of one mare—			
Wm. McLaughlin, Kansas City	50 00	50 00	

CLASS VI—HACKNEY.

6. Mare, four years or over—			
Mrs. E. A. Ashbrook, Kansas City	40 00	40 00	

CLASS VIII—SADDLE HORSES.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Stallion, four years or over—			
J. A. Doniphan, St. Joseph	50 00	50 00	30 00
2. Stallion, three years, under four—			
J. A. Potts, Mexico	50 00	50 00	30 00
Ed. S. Shultz, Garden City	....	....	25 00
3. Stallion, two years, under three—			
Wallace Estill, Estill	75 00	75 00	30 00
J. A. Potts, Mexico	25 00	25 00	25 00
4. Stallion, one year, under two—			
H. B. Hawkins, Marshall	30 00	30 00	
6. Mare, four years or over—			
Houston Wyeth, St. Joseph	50 00	50 00	30 00
M. R. Orthwein, St. Louis	30 00	30 00	25 00
Tom Bass, Mexico	....	....	20 00
Ed. McAlester, St. Joseph	....	....	15 00
7. Mare, three years, under four—			
W. H. Brown, Mexico	40 00	40 00	30 00
T. B. Small, Sedalia	30 00	30 00	25 00
10. Mare, under one year—			
C. F. Clark, Mexico	40 00	40 00	
24. Two animals, either sex, any age, produce of one mare—			
Potts & Morris, Mexico	20 00	20 00	
30. Gelding, four years or over—			
Thos. Dunn, St. Louis	30 00	30 00	30 00
John T. Hook, Paris	25 00	25 00	25 00
Dr. Crowley, St. Louis	15 00	15 00	20 00
31. Gelding, three years and under four—			
T. B. Small, Sedalia	30 00	30 00	30 00
33. Mare, four years or over—			
Tom Bass, Mexico	25 00	25 00	30 00
34. Mare, three years and under four—			
John T. Hook, Paris	30 00	30 00	30 00

CLASS IX—SHETLAND PONY.

1. Stallion, four years or over—			
B. F. Shellman, Weatherby	25 00	25 00	20 00

CLASS X—PERCHERON.

1. Stallion, four years or over—			
Wm. McLaughlin, Kansas City	75 00	75 00	20 00
Wm. Fetch & Son, St. Charles	....	....	15 00
Wm. McLaughlin, Kansas City	....	....	10 00
2. Stallion, three years and under four—			
Wm. McLaughlin, Kansas City	100 00	100 00	20 00
Wm. McLaughlin, Kansas City	75 00	75 00	15 00
3. Stallion, two years and under three—			
Wm. McLaughlin, Kansas City	75 00	75 00	20 00
Wm. McLaughlin, Kansas City	50 00	50 00	15 00
4. Stallion, one year and under two—			
Wm. McLaughlin, Kansas City	75 00	75 00	20 00
6. Mare, four years or over—			
Wm. McLaughlin, Kansas City	75 00	75 00	20 00
11. Champion stallion, two years and over—			
Wm. McLaughlin, Kansas City	150 00	150 00	
19. Grand champion stallion, any age—			
Wm. McLaughlin, Kansas City	250 00	250 00	
23. Four animals, either sex, any age, get of one sire—			
Wm. McLaughlin, Kansas City	100 00	100 00	
Wm. McLaughlin, Kansas City	75 00	75 00	
24. Two animals, either sex, any age, produce of one mare—			
Wm. McLaughlin, Kansas City	75 00	75 00	
Wm. McLaughlin, Kansas City	65 00	65 00	

CLASS XI—FRENCH DRAFT.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Stallion, four years or over—			
Wm. McLaughlin, Kansas City	40 00	40 00	20 00
Wm. McLaughlin, Kansas City	....	....	15 00
2. Stallion, three years and under four—			
Wm. McLaughlin, Kansas City	75 00	75 00	20 00
Wm. McLaughlin, Kansas City	40 00	40 00	15 00
3. Stallion, two years and under three—			
Wm. McLaughlin, Kansas City	50 00	50 00	20 00
4. Stallion, one year and under two—			
Wm. McLaughlin, Kansas City	75 00	75 00	20 00
13. Champion stallion, two years or under—			
Wm. McLaughlin, Kansas City	100 00	100 00	
23. Four animals, either sex, any age, get of one sire—			
Wm. McLaughlin, Kansas City	100 00	100 00	
24. Two animals, either sex, any age, produce of one mare—			
Wm. McLaughlin, Kansas City	75 00	75 00	

CLASS XIV—BELGIAN DRAFT.

	World's Fair prize.	Duplicate paid by Missouri.
1. Stallion, four years or over—		
Wm. McLaughlin, Kansas City	50 00	50 00
Wm. McLaughlin, Kansas City	25 00	25 00
2. Stallion, two years and under four—		
Wm. McLaughlin, Kansas City	75 00	75 00
3. Stallion, two years and under three—		
Wm. McLaughlin, Kansas City	50 00	50 00
23. Four animals, either sex, any age, get of one sire—		
Wm. McLaughlin, Kansas City	75 00	75 00
24. Two animals, either sex, any age, produce of one mare—		
Wm. McLaughlin, Kansas City	50 00	50 00

CLASS XVII—JACKS AND JENNETS.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Jack, four years or over—			
L. M. Monsees & Sons, Smithton	100 00	100 00	60 00
L. M. Monsees & Sons, Smithton	75 00	75 00	55 00
L. M. Emerson, Bowling Green	....	....	50 00
W. B. Gibson, Blackwater	....	....	45 00
L. M. Emerson, Bowling Green	....	....	40 00
2. Jack, three years and under four—			
L. M. Emerson, Bowling Green	100 00	100 00	60 00
L. M. Monsees & Sons, Smithton	75 00	75 00	55 00
L. M. Monsees & Sons, Smithton	30 00	30 00	50 00
L. M. Emerson, Bowling Green	....	....	45 00
3. Jack, two years and under three—			
L. M. Monsees & Sons, Smithton	100 00	100 00	60 00
R. H. Cawthorne, Mexico	75 00	75 00	55 00
Frank Barley, Latour	50 00	50 00	50 00
J. H. Harris, Lee's Summit	40 00	40 00	45 00
L. M. Emerson, Bowling Green	30 00	30 00	40 00
4. Jack, one year and under two—			
L. M. Monsees & Sons, Smithton	50 00	50 00	40 00
L. M. Monsees & Sons, Smithton	40 00	40 00	35 00
L. M. Emerson, Bowling Green	25 00	25 00	30 00
Fred Harris, Lee's Summit	....	....	25 00
H. H. Taylor, Sedalia	....	....	20 00
5. Jack, under one year—			
L. M. Monsees & Sons, Smithton	75 00	75 00	40 00
L. M. Emerson, Bowling Green	40 00	40 00	35 00
L. M. Monsees & Sons, Smithton	30 00	30 00	30 00
L. M. Emerson, Bowling Green	....	....	25 00
6. Jennet, four years or over—			
L. M. Monsees & Sons, Smithton	100 00	100 00	60 00
L. M. Monsees & Sons, Smithton	75 00	75 00	55 00
Fred Harris, Lee's Summit	30 00	30 00	50 00
Fred Harris, Lee's Summit	....	....	45 00
L. M. Emerson, Bowling Green	....	....	40 00

CLASS XVII—JACKS AND JENNETS—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
7. Jennet, three years and under four—			
L. M. Monsees & Sons, Smithton	100 00	100 00	60 00
L. M. Monsees & Sons, Smithton	75 00	75 00	55 00
L. M. Emerson, Bowling Green	50 00	50 00	50 00
L. M. Emerson, Bowling Green	40 00	40 00	45 00
8. Jennet, two years and under three—			
L. M. Monsees & Sons, Smithton	75 00	75 00	40 00
Fred Harris, Lee's Summit	50 00	50 00	35 00
L. M. Monsees & Sons, Smithton	30 00	30 00	30 00
9. Jennet, one year and under two—			
L. M. Monsees & Sons, Smithton	75 00	75 00	40 00
Fred Harris, Lee's Summit	50 00	50 00	35 00
L. M. Monsees & Sons, Smithton	25 00	25 00	30 00
Fred Harris, Lee's Summit			25 00
L. M. Emerson, Bowling Green			20 00
10. Jennet, under one year—			
L. M. Monsees & Sons, Smithton	75 00	75 00	40 00
L. M. Monsees & Sons, Smithton	30 00	30 00	35 00
L. M. Emerson, Bowling Green	25 00	25 00	30 00
L. M. Emerson, Bowling Green			25 00
Fred Harris, Lee's Summit			20 00
11. Champion jack, three years or over—			
L. M. Monsees & Sons, Smithton	150 00	150 00	
13. Champion jack, two years or under—			
L. M. Monsees & Sons, Smithton	100 00	100 00	
15. Champion jennet, three years and over—			
L. M. Monsees & Sons, Smithton	150 00	150 00	
17. Champion jennet, two years or under—			
L. M. Monsees & Sons, Smithton	100 00	100 00	
19. Grand champion jack, any age—			
L. M. Monsees & Sons, Smithton	350 00	350 00	
21. Grand champion jennet, any age—			
L. M. Monsees & Sons, Smithton	250 00	250 00	
23. Four animals, either sex, any age, get of one sire—			
L. M. Monsees & Sons, Smithton	100 00	100 00	70 00
J. H. Harris, Lee's Summit	55 00	55 00	60 00
J. H. Harris & Sons, Lee's Summit	45 00	45 00	50 00
L. M. Monsees & Sons, Smithton	30 00	30 00	40 00
24. Two animals, either sex, any age, produce of one jennet—			
L. M. Monsees & Sons, Smithton	75 00	75 00	60 00
L. M. Monsees & Sons, Smithton	55 00	55 00	50 00
L. M. Emerson, Bowling Green	40 00	40 00	40 00
Fred Harris, Lee's Summit			30 00
25. Jack and four jennets, three years or over—			
L. M. Monsees & Sons, Smithton	150 00	150 00	80 00
L. M. Monsees & Sons, Smithton	125 00	125 00	70 00
L. M. Emerson, Bowling Green	75 00	75 00	60 00
26. Jack and four jennets, under three years—			
L. M. Monsees & Sons, Smithton	125 00	125 00	80 00
L. M. Monsees & Sons, Smithton	75 00	75 00	70 00
L. M. Emerson, Bowling Green	50 00	50 00	60 00
Fred Harris, Lee's Summit	40 00	40 00	40 00
27. Jack and three jennets, three years or over, bred by exhibitor—			
L. M. Monsees & Sons, Smithton	300 00	300 00	125 00

CLASS XVIII—MULES.

1. Mule, four years or over—			
W. A. Elgin, Platte City	$50 00	$50 00	$50 00
W. A. Elgin, Platte City	30 00	30 00	45 00
Barnett & Gusewelle, Gallatin	25 00	25 00	40 00
R. M. Baker, Williamstown	20 00	20 00	35 00
Blackburn & Jones, Warrensburg			30 00
J. P. Wilson, Wellsville			25 00
Barnett & Gusewelle, Gallatin			20 00
E. L. Ashbaugh, Festus			15 00
2. Mule, three years and under four—			
J. P. Wilson, Wellsville	50 00	50 00	50 00
Blackburn & Jones, Warrensburg	40 00	40 00	45 00
Blackburn & Jones, Warrensburg	30 00	30 00	40 00
J. D. Gentry, Regal	25 00	25 00	35 00
J. D. Gentry, Regal	20 00	20 00	30 00

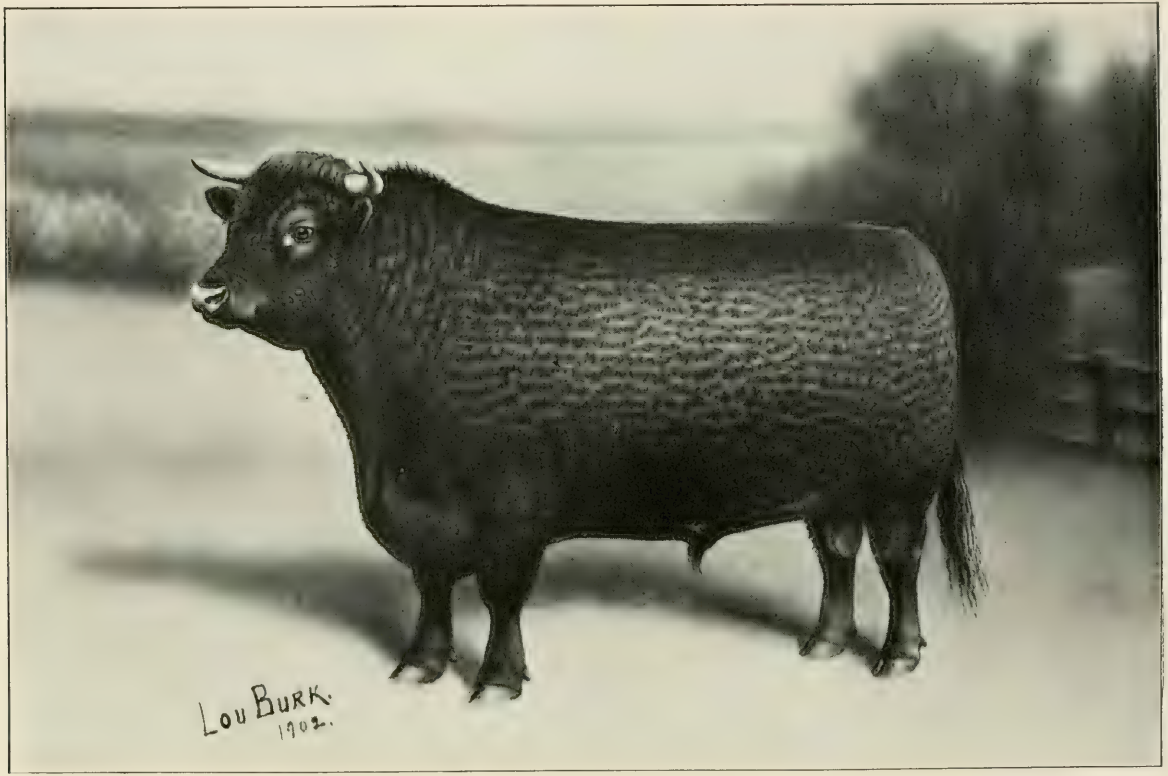
CLASS XVIII—MULES—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
3. Mule, two years and under three—			
Blackburn & Jones, Warrensburg	50 00	50 00	50 00
T. R. VanCleve, Old Orchard	30 00	30 00	45 00
Womack Bros., Fulton	25 00	25 00	40 00
Blackburn & Jones, Warrensburg	....	....	35 00
4. Mule, one year and under two—			
Blackburn & Jones, Warrensburg	35 00	35 00	50 00
E. F. Kendrick, Knobnoster	30 00	30 00	45 00
H. M. Fewell, Calhoun	25 00	25 00	40 00
E F. Kendrick, Knobnoster	20 00	20 00	35 00
H. M. Fewell, Calhoun	15 00	15 00	30 00
Blackburn & Jones, Warrensburg	....	....	25 00
5. Mule, under one year—			
Womack Bros., Fulton	35 00	35 00	50 00
6. Single mule, fourteen and under fifteen hands—			
Blackburn & Jones, Warrensburg	50 00	50 00	25 00
Blackburn & Jones, Warrensburg	40 00	40 00	20 00
7. Single mule, fifteen and under sixteen hands—			
Barnett & Gusewelle, Gallatin	50 00	50 00	50 00
Barnett & Gusewelle, Gallatin	40 00	40 00	35 00
Blackburn & Jones, Warrensburg	30 00	30 00	40 00
Blackburn & Jones, Warrensburg	25 00	25 00	35 00
E. V. Kendrick, Knobnoster	20 00	20 00	30 00
E. V. Kendrick, Knobnoster	....	....	25 00
H. M. Fewell, Calhoun	....	....	20 00
H. M. Fewell, Calhoun	....	....	15 00
8. Single mule, sixteen hands or over—			
W. A. Elgin, Platte City	50 00	50 00	50 00
J. P. Wilson, Wellsville	40 00	40 00	45 00
W. A. Elgin, Platte City	30 00	30 00	40 00
H. C. Campbell, Trenton	25 00	25 00	35 00
Blackburn & Jones, Warrensburg	20 00	20 00	30 00
Blackburn & Jones, Warrensburg	....	....	25 00
M. B. Murray, Hereford	....	....	20 00
Barnett & Gusewelle, Gallatin	....	....	15 00
9. Single mule, sixteen hands or over, to cart—			
W. A. Elgin, Platte City	50 00	50 00	
W. A. Elgin, Platte City	40 00	40 00	
J. P. Wilson, Wellsville	30 00	30 00	
H. C. Campbell, Trenton	25 00	25 00	
J. P. Wilson, Wellsville	20 00	20 00	
10. Pair mules, fourteen and under fifteen hands, to wagon—			
Blackburn & Jones, Warrensburg	100 00	100 00	40 00
Blackburn & Jones, Warrensburg	75 00	75 00	35 00
11. Pair mules, fifteen and under sixteen hands, to wagon—			
Barnett & Gusewelle, Gallatin	100 00	100 00	70 00
Blackburn & Jones, Warrensburg	75 00	75 00	60 00
E. F. Kendrick, Knobnoster	50 00	50 00	50 00
H. M. Fewell, Calhoun	40 00	40 00	40 00
Blackburn & Jones, Warrensburg	30 00	30 00	30 00
12. Pair mules, sixteen hands or over, to wagon—			
W. A. Elgin, Platte City	100 00	100 00	70 00
W. A. Elgin, Platte City	75 00	75 00	60 00
H. C. Campbell, Trenton	50 00	50 00	50 00
Blackburn & Jones, Warrensburg	40 00	40 00	40 00
R. M. Baker, Williamstown	....	....	30 00
13. Three mules abreast to wagon—			
W. A. Elgin, Platte City	100 00	100 00	70 00
Blackburn & Jones, Warrensburg	75 00	75 00	60 00
H. C. Campbell, Trenton	50 00	50 00	50 00
Barnett & Gusewelle, Gallatin	40 00	40 00	40 00
J. D. Gentry, Regal	30 00	30 00	30 00
14. Four-mule team to wagon, wheelers weighing 1200 pounds or over—			
W. A. Elgin, Platte City	125 00	125 00	80 00
Blackburn & Jones, Warrensburg	100 00	100 00	70 00
H. C. Campbell, Trenton	75 00	75 00	60 00
Barnett & Gusewelle, Gallatin	50 00	50 00	50 00
15. Six-mule team to wagon, wheelers weighing 1200 pounds or over—			
W. A. Elgin, Platte City	150 00	150 00	80 00
Blackburn & Jones, Warrensburg	125 00	125 00	70 00
Barnett & Gusewelle, Gallatin	75 00	75 00	60 00
Blackburn & Jones, Warrensburg	50 00	50 00	50 00
J. D. Gentry, Regal	40 00	40 00	

DIVISION "B"—CATTLE.

CLASS XXV—SHORTHORNS.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Bull, three years or over—			
Tebo Land and Cattle Co., Clinton	$75 00	$75 00	$50 00
Alex. Frazier, Kansas City	....	....	45 00
2. Bull, two years and under three—			
C. D. Bellows, Maryville	60 00	60 00	50 00
Purdy Bros., Harris	50 00	50 00	45 00
Geo. Bothwell, Nettleton	....	....	40 00
Bruce Devault, New Florence	....	....	35 00
3. Bull, eighteen and under twenty-four months—			
T. J. Wornall & Sons, Liberty	50 00	50 00	50 00
Joseph Duncan, Osborn	....	....	45 00
T. J. Wornall & Sons, Liberty	....	....	40 00
4. Bull, twelve and under 18 months—			
C. D. Bellows, Maryville	40 00	40 00	50 00
Tebo Land and Cattle Co., Clinton	30 00	30 00	45 00
W. A. Forsythe, Greenwood	....	....	40 00
C. D. Bellows, Maryville	....	....	35 00
B. T. Devault, New Florence	....	....	30 00
5. Bull, six and under twelve months—			
Tebo Land and Cattle Co., Clinton	30 00	30 00	50 00
Purdy Bros., Harris	25 00	25 00	45 00
Tebo Land and Cattle Co., Clinton	20 00	20 00	40 00
Purdy Bros., Harris	....	....	35 00
C. D. Bellows, Maryville	....	....	30 00
T. J. Wornall & Sons, Liberty	....	....	25 00
6. Bull, under six months—			
C. D. Bellows, Maryville	30 00	30 00	50 00
7. Cow, three years and over—			
Tebo Land and Cattle Co., Clinton	....	....	50 00
8. Heifer, two years and under three—			
Tebo Land and Cattle Co., Clinton	....	....	50 00
Tebo Land and Cattle Co., Clinton	....	....	45 00
Creswell & Carpenter, Braymer	....	....	40 00
Geo. Bothwell, Nettleton	....	....	35 00
Creswell & Carpenter, Braymer	....	....	30 00
T. J. Wornall & Sons, Liberty	....	....	25 00
9. Heifer, eighteen and under twenty-four months—			
C. D. Bellows, Maryville	50 00	50 00	50 00
Tebo Land and Cattle Co., Clinton	....	....	45 00
T. J. Wornall & Sons, Liberty	....	....	40 00
W. A. Forsythe, Greenwood	....	....	35 00
T. J. Wornall & Sons, Liberty	....	....	30 00
10. Heifer, twelve and under eighteen months—			
Purdy Bros., Harris	40 00	40 00	50 00
C. D. Bellows, Maryville	30 00	30 00	45 00
T. J. Wornall & Sons, Liberty	25 00	25 00	25 00
Geo. Bothwell, Nettleton	....	....	35 00
W. A. Forsythe, Greenwood	....	....	30 00
C. D. Bellows, Maryville	....	....	25 00
11. Heifer, six and under twelve months—			
Purdy Bros., Harris	50 00	50 00	50 00
Tebo Land and Cattle Co., Clinton	30 00	30 00	45 00
C. D. Bellows, Maryville	....	....	40 00
Tebo Land and Cattle Co., Clinton	....	....	35 00
T. J. Wornall & Sons, Liberty	....	....	30 00
C. D. Bellows, Maryville	....	....	25 00
12. Heifer, under six months—			
T. J. Wornall & Sons, Liberty	30 00	30 00	50 00
T. J. Wornall & Sons, Liberty	....	....	45 00
T. J. Wornall & Sons, Liberty	....	....	40 00
Creswell & Carpenter, Braymer	....	....	30 00
Geo. Bothwell, Nettleton	....	....	25 00
13. Champion bull, two years or over—			
Tebo Land and Cattle Co., Clinton	100 00	100 00	
21. Grand champion bull, any age—			
Tebo Land and Cattle Co., Clinton	200 00	200 00	
25. Aged herd—			
Tebo Land and Cattle Co., Clinton	100 00	100 00	70 00



Shorthorn Bull, "Lord Lovell," 130457, owned by Purdy Bros., Harris, Missouri. Sire of young herd exhibited by them at St. Louis World's Fair. This young herd won $2,000 in cash prizes.

CLASS XXV—SHORTHORNS—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
26. Young Herd—			
C. D. Bellows, Maryville	75 00	75 00	70 00
Purdy Bros., Harris	60 00	60 00	60 00
C. D. Bellows, Maryville	55 00	55 00	50 00
Tebo Land and Cattle Co., Clinton	....	....	40 00
28. Young herd, females bred by exhibitor—			
C. D. Bellows, Maryville	200 00	200 00	100 00
Purdy Bros., Harris	....	....	60 00
C. D. Bellows, Maryville	....	....	40 00
29. Four animals, either sex, any age, get of one sire—			
C. D. Bellows, Maryville	65 00	65 00	60 00
Tebo Land and Cattle Co., Clinton	45 00	45 00	50 00
C. D. Bellows, Maryville	40 00	40 00	40 00
T. J. Wornall & Sons, Liberty	....	....	30 00
30. Two animals, either sex, any age, produce of one cow—			
Purdy Bros., Harris	55 00	55 00	60 00
T. J. Wornall & Sons, Liberty	45 00	45 00	50 00
C. D. Bellows, Maryville	....	....	40 00
C. D. Bellows, Maryville	....	....	30 00
40. Fat steer or spayed heifer, eighteen and under twenty-four months—			
Purdy Bros., Harris	40 00	40 00	
44. Champion fat steer or spayed heifer, any age—			
Purdy Bros., Harris	100 00	100 00	

CLASS XXVI—HEREFORD.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Bull, three years or over—			
Gudgell & Simpson, Independence	60 00	60 00	50 00
Jas. A. Funkhouser, Plattsburg	50 00	50 00	45 00
O. Harris, Harris	40 00	40 00	40 00
C. N. Moore, Lee's Summit	30 00	30 00	35 00
Benton Gabbert, Dearborn	....	....	30 00
Gudgell & Simpson, Independence	....	....	25 00
2. Bull, two years and under three—			
C. G. Comstock, Albany	75 00	75 00	50 00
O. Harris, Harris	60 00	60 00	45 00
S. L. Brock, Macon	30 00	30 00	40 00
Gudgell & Simpson, Independence	....	....	35 00
Walter B. Wadell, Lexington	....	....	30 00
3. Bull, eighteen and under twenty-four months—			
Jas. A. Funkhouser, Plattsburg	75 00	75 00	50 00
O. Harris, Harris	60 00	60 00	45 00
S. L. Brock, Macon	....	....	40 00
Stewart & Hutcheon, Bolckow	....	....	35 00
Benton Gabbert, Dearborn	....	....	30 00
Egger Hereford Cattle Co., Appleton City	....	....	25 00
4. Bull, twelve and under eighteen months—			
Gudgell & Simpson, Independence	50 00	50 00	50 00
Jas. A. Funkhouser, Plattsburg	40 00	40 00	45 00
Benton Gabbert & Son, Dearborn	30 00	30 00	40 00
S. L. Brock, Macon	....	....	35 00
Dette Bros., Brinktown	....	....	30 00
Gudgell & Simpson, Independence	....	....	25 00
5. Bull, six and under twelve months—			
Stewart & Hutcheon, Bolckow	50 00	50 00	50 00
O. Harris, Harris	40 00	40 00	45 00
S. L. Brock, Macon	30 00	30 00	40 00
Gudgell & Simpson, Independence	25 00	25 00	35 00
C. N. Moore, Lee's Summit	....	....	30 00
Benton Gabbert & Son, Dearborn	....	....	25 00
6. Bull, under sixmonths—			
Gudgell & Simpson, Independence	50 00	50 00	50 00
O. Harris, Harris	40 00	40 00	45 00
Jas. A. Funkhouser, Plattsburg	30 00	30 00	40 00
Stewart & Hutcheon, Bolckow	20 00	20 00	35 00
Jas. A. Funkhouser, Plattsburg	....	....	30 00
Gudgell & Simpson, Independence	....	....	25 00
7. Cow, three years or over—			
Gudgell & Simpson, Independence	50 00	50 00	50 00
Gudgell & Simpson, Independence	....	....	40 00
O. Harris, Harris	....	....	35 00
Egger Hereford Cattle Co., Appleton City	....	....	30 00
Egger Hereford Cattle Co., Appleton City	....	....	25 00

CLASS XXVI—HEREFORD—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
8. Heifer, two years and under three—			
O. Harris, Harris	75 00	75 00	50 00
Jas. A. Funkhouser, Plattsburg	50 00	50 00	45 00
Stewart & Hutcheon, Bolckow	....	....	40 00
O. Harris, Harris	....	....	25 00
Gudgell & Simpson, Independence	....	....	30 00
Benton Gabbert & Son, Dearborn	....	....	25 00
9. Heifer, eighteen and under twenty-four months—			
O. Harris, Harris	75 00	75 00	50 00
O. Harris, Harris	60 00	60 00	45 00
Jas. A. Funkhouser, Plattsburg	50 00	50 00	40 00
Gudgell & Simpson, Independence	....	....	35 00
S. L. Brock, Macon	....	....	30 00
Benton Gabbert & Son, Dearborn	....	....	25 00
10. Heifer, twelve and under eighteen months—			
O. Harris, Harris	50 00	50 00	50 00
Jas. A. Funkhouser, Plattsburg	40 00	40 00	45 00
Stewart & Hutcheon, Bolckow	30 00	30 00	40 00
O. Harris, Harris	....	....	35 00
Gudgell & Simpson, Independence	....	....	30 00
Gudgell & Simpson, Independence	....	....	25 00
11. Heifer, six and under twelve months—			
O. Harris, Harris	50 00	50 00	50 00
Stewart & Hutcheon, Bolckow	40 00	40 00	45 00
O. Harris, Harris	30 00	30 00	40 00
Jas. A. Funkhouser, Plattsburg	25 00	25 00	35 00
Gudgell & Simpson, Independence	20 00	20 00	30 00
Gudgell & Simpson, Independence	....	....	25 00
12. Heifer, under six months—			
O. Harris, Harris	50 00	50 00	50 00
Gudgell & Simpson, Independence	40 00	40 00	45 00
O. Harris, Harris	30 00	30 00	40 00
Jas. A. Funkhouser, Plattsburg	....	....	35 00
Gudgell & Simpson, Independence	....	....	30 00
Jas. A. Funkhouser, Plattsburg	....	....	25 00
13. Champion bull, under three years—			
Stewart & Hutcheon, Bolckow	75 00	75 00	
14. Champion heifer, under two years—			
O. Harris, Harris	75 00	75 00	
25. Aged herd—			
O. Harris, Harris	125 00	125 00	70 00
Jas. A. Funkhouser, Plattsburg	100 00	100 00	60 00
Gudgell & Simpson, Independence	65 00	65 00	50 00
Gabbert & Son, Dearborn	....	....	40 00
26. Young herd—			
O. Harris, Harris	75 00	75 00	70 00
Jas. A. Funkhouser, Plattsburg	60 00	60 00	60 00
Gudgell & Simpson, Independence	55 00	55 00	50 00
Stewart & Hutcheon, Bolckow	....	....	40 00
27. Aged herd, females bred by exhibitor—			
O. Harris, Harris	200 00	200 00	100 00
Jas. A. Funkhouser, Plattsburg	....	....	60 00
Gudgell & Simpson, Independence	....	....	40 00
28. Young herd, females bred by exhibitor—			
O. Harris, Harris	200 00	200 00	100 00
Jas. A. Funkhouser, Plattsburg	....	....	60 00
Gudgell & Simpson, Independence	....	....	40 00
29. Four animals, either sex, any age, get of one sire—			
Jas. A. Funkhouser, Plattsburg	65 00	65 00	60 00
O. Harris, Harris	40 00	40 00	50 00
Stewart & Hutcheon, Bolckow	....	....	40 00
Gudgell & Simpson, Independence	....	....	30 00
30. Two animals, either sex, any age, produce of one cow—			
Jas. A. Funkhouser, Plattsburg	65 00	65 00	60 00
Benton Gabbert & Son, Dearborn	55 00	55 00	50 00
Jas. A. Funkhouser, Plattsburg	45 00	45 00	40 00
O. Harris, Harris	40 00	40 00	30 00
[illegible] *Fat steer or spayed heifer, two years and under three—			
O. Harris, Harris	30 00	30 00	
S. L. Brock, Macon	25 00	25 00	
31. *Fat steer or spayed heifer, eighteen and under twenty-four months—			
S. L. Brock, Macon	30 00	30 00	
O. Harris, Harris	25 00	25 00	
32. Fat steer or spayed heifer, twelve and under eighteen months —			
S. L. Brock, Macon	30 00	30 00	

CLASS XXVI—HEREFORD—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
36. *Fat steer or spayed heifer, six and under twelve months—			
S. L. Brock, Macon	30 00	30 00	
S. L. Brock, Macon	25 00	25 00	
37. Fat steer or spayed heifer, under six months—			
S. L. Brock, Macon	30 00	30 00	
39. *Fat steer or spayed heifer, two years and under three—			
R. O. Matson, Windsor	30 00	30 00	25 00
40. *Fat steer or spayed heifer, eighteen and under twenty-four months—			
S. L. Brock, Macon	40 00	40 00	25 00
42. *Fat steer or spayed heifer, six and under twelve months—			
S. L. Brock, Macon	40 00	40 00	25 00
44. Fat steer or spayed heifer, any age—			
S. L. Brock, Macon	100 00	100 00	
*Two classes; one pure breds, one grades.			

CLASS XXXII—B. FAT ANIMAL. CHAMPION OVER ALL.

6. Steer or spayed heifer, all breeds and ages—			
S. L. Brock, Macon	$200 00	$200 00	

CLASS XXVII—ABERDEEN ANGUS.

1. Bull, three years or over—			
Elm Park Cattle Co., Harris	....	....	$40 00
H. W. Elliott, Estill	....	....	35 00
2. Bull, two years and under three—			
J. B. Withers, Missouri City	$40 00	$40 00	40 00
Berry Lucas, Hamilton	....	....	35 00
3. Bull, eighteen and under twenty-four months—			
H. W. Elliott, Estill	50 00	50 00	40 00
Berry Lucas, Hamilton	....	....	35 00
4. Bull, twelve and under eighteen months—			
H. W. Elliott, Estill	30 00	30 00	40 00
W. J. Turpin, Carrollton	....	....	35 00
5. Bull, six and under twelve months—			
McLaughlin Bros. & Johnson, Estill	30 00	30 00	40 00
W. J. Turpin, Carrollton	....	....	35 00
Elm Park Cattle Co., Harris	....	....	30 00
H. W. Elliott, Estill	....	....	25 00
6. Bull, under six months—			
J. B. Withers, Missouri City	30 00	30 00	40 00
Elm Park Cattle Co., Harris	20 00	20 00	35 00
7. Cow, three years or over—			
Elm Park Cattle Co., Harris	....	....	40 00
W. J. Turpin, Carrollton	....	....	35 00
Berry Lucas, Hamilton	....	....	30 00
H. W. Elliott, Estill	....	....	25 00
H. W. Elliott, Estill	....	....	20 00
8. Heifer, two years and under three—			
W. J. Turpin, Carrollton	....	....	40 00
Elm Park Cattle Co., Harris	....	....	35 00
H. W. Elliott, Estill	....	....	30 00
H. W. Elliott, Estill	....	....	25 00
Berry Lucas, Hamilton	....	....	20 00
9. Heifer, eighteen and under twenty-four months—			
W. J. Turpin, Carrollton	....	....	40 00
Elm Park Cattle Co., Harris	....	....	35 00
W. J. Turpin, Carrollton	....	....	30 00
Elm Park Cattle Co., Harris	....	....	25 00
H. W. Elliott, Estill	....	....	20 00
10. Heifer, twelve and under eighteen months—			
J. B. Withers, Missouri City	....	....	40 00
H. W. Elliott, Estill	....	....	35 00
Berry Lucas, Hamilton	....	....	30 00

CLASS XXVII—ABERDEEN ANGUS—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
11. Heifer, six and under twelve months—			
H. W. Elliott, Estill	30 00	30 00	40 00
Elm Park Cattle Co., Harris			35 00
W. J. Turpin, Carrollton			30 00
J. B. Withers, Missouri City			25 00
Elm Park Cattle Co., Harris			20 00
12. Heifer, under six months—			
W. J. Turpin, Carrollton			40 00
W. J. Turpin, Carrollton			35 00
Berry Lucas, Hamilton			30 00
25. Aged herds—			
Elm Park Cattle Co., Harris			70 00
H. W. Elliott, Estill			60 00
Berry Lucas, Hamilton			50 00
26. Young herd—			
W. J. Turpin, Carrollton			70 00
Elm Park Cattle Co., Harris			60 00
H. W. Elliott, Estill			50 00
Berry Lucas, Hamilton			40 00
27. Aged herd, females bred by exhibitor—			
H. W. Elliott, Estill			75 00
Berry Lucas, Hamilton			45 00
28. Young herd, females bred by exhibitor—			
W. J. Turpin, Carrollton			75 00
Elm Park Cattle Co., Harris			45 00
H. W. Elliott, Estill			30 00
29. Four animals, either sex, any age, get of one sire—			
Elm Park Cattle Co., Harris			60 00
W. J. Turpin, Carrollton			50 00
H. W. Elliott, Estill			40 00
H. W. Elliott, Estill			30 00
30. Two animals, either sex, any age, produce of one cow—			
Elm Park Cattle Co., Harris			50 00
H. W. Elliott, Estill			40 00
W. J. Turpin, Carrollton			30 00
J. B. Withers, Missouri City			20 00

CLASS XXVIII—GALLOWAY.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Bull, three years or over—			
C. N. Moody, Atlanta	60 00	60 00	40 00
Wm. Brown & Son, Carrollton			35 00
2. Bull, two years and under three—			
F. P. Wild, Cowgill	50 00	50 00	40 00
C. N. Moody, Atlanta	40 00	40 00	35 00
3. Bull, eighteen and under twenty-four months—			
C. N. Moody, Atlanta	75 00	75 00	40 00
4. Bull, twelve and under eighteen months—			
F. P. Wild, Cowgill	30 00	30 00	40 00
C. N. Moody, Atlanta			35 00
5. Bull, six and under twelve months—			
Wm. M. Brown & Son, Carrollton	30 00	30 00	40 00
C. N. Moody, Atlanta	25 00	25 00	35 00
7. Cow, three years or over—			
C. N. Moody, Atlanta	60 00	60 00	40 00
C. N. Moody, Atlanta			35 00
W. M. Brown & Son, Carrollton			30 00
W. M. Brown & Son, Carrollton			25 00
8. Heifer, two years and under three—			
C. N. Moody, Atlanta	75 00	75 00	40 00
C. N. Moody, Atlanta			35 00
F. P. Wild, Cowgill			30 00
9. Heifer, eighteen and under twenty-four months—			
F. P. Wild, Cowgill	40 00	40 00	40 00
F. P. Wild, Cowgill			35 00
10. Heifer, twelve and under eighteen months—			
C. N. Moody, Atlanta			40 00
C. N. Moody, Atlanta			35 00
11. Heifer, six and under twelve months—			
C. N. Moody, Atlanta	30 00	30 00	40 00
W. M. Brown & Son, Carrollton			35 00

CLASS XXVIII—GALLOWAY—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
12. Heifer, under six months—			
C. N. Moody, Atlanta	40 00	40 00	40 00
W. M. Brown & Son, Carrollton	....	....	35 00
17. Champion cow, two years or over—			
C. N. Moody, Atlanta	100 00	100 00	
23. Grand champion cow or heifer, any age—			
C. N. Moody, Atlanta	200 00	200 00	
25. Aged herd—			
C. N. Moody, Atlanta	125 00	125 00	70 00
F. P. Wild, Cowgill	....	....	60 00
C. N. Moody, Atlanta	....	....	50 00
26. Young herd—			
C. N. Moody, Atlanta	45 00	45 00	70 00
27. Aged herd, females bred by exhibitor—			
C. N. Moody, Atlanta	....	....	75 00
28. Young herd, females bred by exhibitor—			
C. N. Moody, Atlanta	....	....	75 00
29. Four animals, either sex, any age, get of one sire—			
C. N. Moody, Atlanta	55 00	55 00	60 00
C. N. Moody, Atlanta	....	....	50 00
30. Two animals, either sex, any age, produce of one cow—			
C. N. Moody, Atlanta	55 00	55 00	50 00
C. N. Moody, Atlanta	40 00	40 00	40 00

CLASS XXXII—BROWN SWISS.

1. Bull, three years or over—			
Harry McCullough, Fayette	$30 00	$30 00	$20 00
Carlos McCullough, Fayette	....	....	15 00
2. Bull, two years and under three—			
Harry McCullough, Fayette	30 00	30 00	20 00
Harry McCullough, Fayette	....	....	15 00
3. Bull, eighteen and under twenty-four months—			
Harry McCullough, Fayette	30 00	30 00	20 00
Carlos McCullough, Fayette	....	....	15 00
Harry McCullough, Fayette	....	....	10 00
4. Bull, twelve and under eighteen months—			
Harry McCullough, Fayette	20 00	20 00	20 00
Harry McCullough, Fayette	15 00	15 00	15 00
Carlos McCullough, Fayette	....	....	10 00
5. Bull, six and under twelve months—			
Harry McCullough, Fayette	30 00	30 00	20 00
Harry McCullough, Fayette	20 00	20 00	15 00
Carlos McCullough, Fayette	....	....	10 00
6. Bull, under six months—			
Harry McCullough, Fayette	25 00	25 00	20 00
Carlos McCullough, Fayette	15 00	15 00	15 00
Harry McCullough, Fayette	....	....	10 00
7. Cow, three years or over—			
Harry McCullough, Fayette	....	....	20 00
Carlos McCullough, Fayette	....	....	15 00
Harry McCullough, Fayette	....	....	10 00
8. Heifer, two years and under three—			
Harry McCullough, Fayette	30 00	30 00	20 00
Harry McCullough, Fayette	25 00	25 00	15 00
Carlos McCullough, Fayette	20 00	20 00	10 00
9. Heifer, eighteen and under twenty-four months—			
Harry McCullough, Fayette	40 00	40 00	20 00
Harry McCullough, Fayette	20 00	20 00	15 00
10. Heifer, twelve and under eighteen months—			
Harry McCullough, Fayette	30 00	30 00	20 00
Carlos McCullough, Fayette	....	....	15 00
Harry McCullough, Fayette	....	....	10 00
11. Heifer, six and under twelve months—			
Harry McCullough, Fayette	25 00	25 00	20 00
Harry McCullough, Fayette	20 00	20 00	15 00
Carlos McCullough, Fayette	....	....	10 00
12. Heifer, under six months—			
Harry McCullough, Fayette	30 00	30 00	20 00
Harry McCullough, Fayette	....	....	15 00
Carlos McCullough, Fayette	....	....	10 00

CLASS XXXII—BROWN SWISS—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
25. Aged herd—			
Harry McCullough, Fayette	40 00	40 00	40 00
Harry McCullough, Fayette	30 00	30 00	30 00
26. Young herd—			
Harry McCullough, Fayette	40 00	40 00	40 00
Harry McCullough, Fayette	20 00	20 00	30 00
27. Aged herd, females bred by exhibitor—			
Harry McCullough, Fayette	....	....	30 00
Harry McCullough, Fayette	....	....	20 00
28. Young herd, females bred by exhibitor—			
Harry McCullough, Fayette	....	....	30 00
29. Four animals, either sex, any age, get of one sire—			
Harry McCullough, Fayette	35 00	35 00	30 00
Harry McCullough, Fayette	....	....	20 00
30. Two animals, either sex, any age, produce of one cow—			
Harry McCullough, Fayette	20 00	20 00	20 00
Harry McCullough, Fayette	....	....	10 00

CLASS XXXIII—JERSEY.

1. Bull, three years or over—			
C. E. Still, Kirksville	$50 00	$50 00	$40 00
Rolla Oliver, Dearborn	....	....	35 00
Mrs. S. B. Thomas, St. Joseph	....	....	30 00
C. E. Still, Kirksville	....	....	25 00
Robert I. Young, St. Joseph	....	....	20 00
2. Bull, two years and under three—			
C. E. Still, Kirksville	40 00	40 00	40 00
C. T. Graves, Maitland	30 00	30 00	35 00
Robert I. Young, St. Joseph	....	....	30 00
Robert I. Young, St. Joseph	....	....	25 00
3. Bull, one year and under two—			
Rolla Oliver, Dearborn	20 00	20 00	40 00
Rolla Oliver, Dearborn	....	....	45 00
C. E. Still, Kirksville	....	....	30 00
C. T. Graves, Maitland	....	....	25 00
Robert I. Young, St. Joseph	....	....	20 00
4. Bull, under one year—			
Rolla Oliver, Dearborn	30 00	30 00	40 00
C. E. Still, Kirksville	25 00	25 00	35 00
Mrs. S. B. Thomas, St. Joseph	....	....	30 00
Rolla Oliver, Dearborn	....	....	25 00
Robert I. Young, St. Joseph	....	....	20 00
5. Cow, three years or over—			
C. E. Still, Kirksville	50 00	50 00	40 00
Rolla Oliver, Dearborn	....	....	35 00
Rolla Oliver, Dearborn	....	....	30 00
Mrs. S. B. Thomas, St. Joseph	....	....	25 00
C. T. Graves, Maitland	....	....	20 00
6. Heifer, two years and under three—			
C. T. Graves, Maitland	75 00	75 00	40 00
C. E. Still, Kirksville	40 00	40 00	35 00
C. E. Still, Kirksville	....	....	30 00
Rolla Oliver, Dearborn	....	....	25 00
Mrs. S. B. Thomas, St. Joseph	....	....	20 00
7. Heifer, one year and under two—			
C. E. Still, Kirksville	50 00	50 00	40 00
C. E. Still, Kirksville	20 00	20 00	35 00
Mrs. S. B. Thomas, St. Joseph	....	....	30 00
Mrs. S. B. Thomas, St. Joseph	....	....	25 00
C. T. Graves, Maitland	....	....	20 00
8. Heifer, under one year—			
C. T. Graves, Maitland	50 00	50 00	40 00
Robert I. Young, St. Joseph	30 00	30 00	35 00
C. E. Still, Kirksville	....	....	30 00
Rolla Oliver, Dearborn	....	....	25 00
C. T. Graves, Maitland	....	....	20 00
15. Champion heifer, under two years—			
C. E. Still, Kirksville	75 00	75 00	
21. Aged herd—			
C. E. Still, Kirksville	100 00	100 00	60 00
C. E. Still, Kirksville	....	....	50 00
Mrs. S. B. Thomas, St. Joseph	....	....	40 00
Rolla Oliver, Dearborn	....	....	30 00

CLASS XXXIII—JERSEY—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
22. Young herd—			
C. E. Still, Kirksville	65 00	65 00	60 00
Mrs. S. B. Thomas, St. Joseph	45 00	45 00	50 00
C. T. Graves, Maitland	....	....	30 00
Rolla Oliver, Dearborn	....	....	40 00
23. Aged herd, females bred by exhibitor—			
C. E. Still, Kirksville	....	....	50 00
Rolla Oliver, Dearborn	....	....	30 00
Robert I. Young, St. Joseph	....	....	30 00
24. Young herd, females bred by exhibitor—			
Mrs. S. B. Thomas, St. Joseph	....	....	50 00
C. T. Graves, Maitland	....	....	30 00
C. E. Still, Kirksville	....	....	20 00
25. Four animals, either sex, any age, get of one sire—			
C. T. Graves, Maitland	40 00	40 00	60 00
C. E. Still, Kirksville	....	....	50 00
C. E. Still, Kirksville	....	....	40 00
Mrs. S. B. Thomas, St. Joseph	....	....	30 00
26. Two animals, either sex, any age, produce of one cow—			
Mrs. S. B. Thomas, St. Joseph	45 00	45 00	50 00
Robert I. Young, St. Joseph	40 00	40 00	40 00
Rolla Oliver, Dearborn	....	....	30 00
Rolla Oliver, Dearborn	....	....	20 00

CLASS XXXIV—HOLSTEIN FRIESIAN.

1. Bull, three years or over—			
*World's Fair Holstein Association	$75 00	$75 00	$40 00
M. E. Moore, Cameron	....	....	35 00
2. Bull, two years and under three—			
M. E. Moore, Cameron	75 00	75 00	40 00
M. E. Moore, Cameron	60 00	60 00	35 00
3. Bull, one year and under two—			
M. E. Moore, Cameron	40 00	40 00	40 00
M. E. Moore, Cameron	30 00	30 00	35 00
J. H. Blodgett, Pleasant Hill	....	....	30 00
4. Bull, under one year—			
M. E. Moore, Cameron	50 00	50 00	40 00
M. E. Moore, Cameron	20 00	20 00	35 00
World's Fair Holstein Association	....	....	30 00
World's Fair Holstein Association	....	....	25 00
5. Cow, three years or over—			
World's Fair Holstein Association	75 00	75 00	40 00
M. E. Moore, Cameron	60 00	60 00	35 00
World's Fair Holstein Association	50 00	50 00	30 00
6. Heifer, two years and under three—			
M. E. Moore, Cameron	....	....	40 00
M. E. Moore, Cameron	....	....	35 00
7. Heifer, one year and under two—			
M. E. Moore, Cameron	....	....	40 00
M. E. Moore, Cameron	....	....	35 00
8. Heifer, under one year—			
World's Fair Holstein Association	50 00	50 00	40 00
M. E. Moore, Cameron	25 00	25 00	35 00
World's Fair Holstein Association	20 00	20 00	30 00
Geo. C. Mosher, Kansas City	....	....	25 00
9. Champion bull, two years or over—			
World's Fair Holstein Association	100 00	100 00	
11. Champion bull, under two years—			
M. E. Moore, Cameron	75 00	75 00	
13. Champion cow, two years or over—			
World's Fair Holstein Association	100 00	100 00	
17. Grand champion bull, any age—			
World's Fair Holstein Association	200 00	200 00	
19. Grand champion cow or heifer, any age—			
World's Fair Holstein Association	200 00	200 00	
21. Aged herd—			
M. E. Moore, Cameron	125 00	125 00	60 00
M. E. Moore, Cameron	65 00	65 00	50 00
22. Young herd—			
M. E. Moore, Cameron	55 00	55 00	60 00
23. Aged herd, females bred by exhibitor—			
M. E. Moore, Cameron	200 00	200 00	50 00

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
24. Young herd, females bred by exhibitor—			
M. E. Moore, Cameron	....	....	50 00
25. Four animals, either sex, any age, get of one sire—			
M. E. Moore, Cameron	75 00	75 00	60 00
26. Two animals, either sex, any age, produce of one cow—			
M. E. Moore, Cameron	75 00	75 00	50 00

*NOTE—The World's Fair Holstein Association was organized for the purpose of having the Holstein Friesian breed represented in the dairy demonstration. The members of the association were: M. E. Moore, Cameron; R. W. McGuire, St. Louis, and Dr. Geo. C. Mosher, Kansas City. The association maintained the high reputation of their favorite breed.

DIVISION "C"—SHEEP AND GOATS.

CLASS XLVI—SHROPSHIRE.

1. Ram, two years or over—			
J. W. Boles, Auxvasse	....	....	$20 00
2. Ram, eighteen and under twenty-four months—			
J. W. Boles, Auxvasse	$45 00	$45 00	20 00
3. Ram, twelve and under eighteen months—			
J. W. Boles, Auxvasse	....	....	20 00
4. Ram, six and under twelve months—			
J. W. Boles, Auxvasse	30 00	30 00	20 00
5. Ram, under six months—			
J. W. Boles, Auxvasse	....	....	20 00
6. Ewe, two years or over—			
J. W. Boles, Auxvasse	....	....	20 00
7. Ewe, eighteen and under twenty-four months—			
J. W. Boles, Auxvasse	30 00	30 00	20 00
J. W. Boles, Auxvasse	....	....	15 00
8. Ewe, twelve and under eighteen months—			
J. W. Boles, Auxvasse	....	....	20 00
9. Ewe, six and under twelve months—			
J. W. Boles, Auxvasse	25 00	25 00	20 00
10. Ewe, under six months—			
J. W. Boles, Auxvasse	....	....	20 00
24. Two animals either sex, any age, produce of one ewe—			
J. W. Boles, Auxvasse	....	....	20 00
25. Ram and three ewes, two years or over—			
J. W. Boles, Auxvasse	....	....	30 00
26. Ram and three ewes under three years—			
J. W. Boles, Auxvasse	....	....	30 00

CLASS XLVII—COTSWOLD.

1. Ram, two years or over—			
John A. Haynes, Richmond	$20 00	20 00	$20 00
John A. Haynes, Richmond	....	....	15 00
Hopson Glascock, Oakwood	....	....	10 00
2. Ram, eighteen and under twenty four months—			
John A. Haynes, Richmond	30 00	30 00	20 00
Hopson Glascock, Oakwood	....	....	15 00
John A. Haynes, Richmond	....	....	10 00
3. Ram, twelve and under eighteen months—			
John A. Haynes, Richmond	45 00	45 00	20 00
John A. Haynes, Richmond	....	....	15 00
Hopson Glascock, Oakwood	....	....	10 00
4. Ram, six and under twelve months—			
John A. Haynes, Richmond	30 00	30 00	20 00
John A. Haynes, Richmond	25 00	25 00	15 00
Hopson Glascock, Oakwood	....	....	10 00
5. Ram, under six months—			
John A. Haynes, Richmond	30 00	30 00	20 00
Hopson Glascock, Oakwood	....	....	15 00
Hopson Glascock, Oakwood	....	....	10 00

CORRECTOR 2ND

Corrector 2d, Senior Champion Poland China Boar at St. Louis, 1904. Corrector has the range, size and finish seldom found in a hog of his scale, weighed 645 pounds at 15 months. Bred and owned by Winn & Mastin, Martin City, Jackson county, Missouri.

CLASS XLVII—COTSWOLD—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
6. Ewe, two years or over—			
John A. Haynes, Richmond	35 00	35 00	20 00
John A. Haynes, Richmond	20 00	20 00	15 00
8. Ewe, twelve and under eighteen months—			
John A. Haynes, Richmond	30 00	30 00	20 00
John A. Haynes, Richmond	....	....	15 00
Hopson Glascock, Oakwood	....	....	10 00
9. Ewe, six and under twelve months—			
John A. Haynes, Richmond	20 00	20 00	20 00
John A. Haynes, Richmond	....	....	15 00
Hopson Glascock, Oakwood	....	....	10 00
10. Ewe, under six months—			
John A. Haynes, Richmond	35 00	35 00	20 00
John A. Haynes, Richmond	25 00	25 00	15 00
Hopson Glascock, Oakwood	....	....	10 00
23. Four animals, either sex, any age, get of one sire—			
John A. Haynes, Richmond	50 00	50 00	30 00
Hopson Glascock, Oakwood	....	....	20 00
24. Two animals, either sex, any age, produce of one ewe—			
John A. Haynes, Richmond	40 00	40 00	20 00
Hopson Glascock, Oakwood	....	....	10 00
25. Ram and three ewes, eighteen months or older—			
John A. Haynes, Richmond	25 00	25 00	30 00
John A. Haynes, Richmond	....	....	20 00
26. Ram and three ewes, under eighteen months—			
John A. Haynes, Richmond	25 00	25 00	30 00
John A. Haynes, Richmond	....	....	20 00
27. Ram and three ewes, eighteen months or older, bred by exhibitor—			
John A. Haynes, Richmond	....	....	30 00
Hopson Glascock, Oakwood	....	....	20 00

CLASS LXI—ANGORA GOATS.

1. Buck, two years or over—			
McVey & Womack Bros., Fulton	....	....	$20 00
6. Doe, two years or over—			
McVey & Womack Bros., Fulton	....	....	20 00

DIVISION "D"—SWINE.

CLASS LXIV—POLAND CHINA.

1. Boar, two years or over—			
Winn & Mastin, Martin City	$25 00	$25 00	$40 00
Geo. W. Falk, Richmond	....	....	35 00
2. Boar, eighteen and under twenty-four months—			
Winn & Mastin, Martin City	35 00	35 00	30 00
3. Boar, twelve and under eighteen months—			
Winn & Mastin, Martin City	60 00	60 00	40 00
Winn & Mastin, Martin City	....	....	35 00
A. E. Schooley, Austin	....	....	30 00
J. R. Young, Richards	....	....	25 00
4. Boar, six and under twelve months—			
Winn & Mastin, Martin City	40 00	40 00	40 00
Winn & Mastin, Martin City	30 00	30 00	35 00
Geo. W. Falk, Richmond	....	....	30 00
A. E. Schooley, Austin	....	....	25 00
U. S. Byrne, Saxton	....	....	20 00
U. S. Byrne, Saxton	....	....	15 00
Wiley, Hoadley & Coleman, Sedalia	....	....	10 00
5. Boar, under six months—			
Winn & Mastin, Martin City	20 00	20 00	40 00
Wiley, Hoadley & Coleman, Sedalia	....	....	35 00
S. Y. Burke, Bolivar	....	....	30 00
E. H. Rogers, Bunceton	....	....	25 00
H. L. Wiley, Sedalia	....	....	20 00
Wiley, Hoadley & Coleman, Sedalia	....	....	15 00
H. L. Wiley, Sedalia	....	....	10 00

CLASS LXIV—POLAND CHINA—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
6. Sow, two years or over—			
Winn & Mastin, Martin City	50 00	50 00	40 00
Winn & Mastin, Martin City	30 00	30 00	35 00
Wiley, Hoadley & Coleman, Sedalia			30 00
7. Sow, eighteen and under twenty-four months—			
Winn & Mastin, Martin City	60 00	60 00	40 00
Winn & Mastin, Martin City	50 00	50 00	35 00
U. S. Byrne, Saxton			30 00
8. Sow, twelve and under eighteen months—			
Winn & Mastin, Martin City	60 00	60 00	40 00
Geo. W. Falk, Richmond			35 00
Geo. W. Falk, Richmond			30 00
Winn & Mastin, Martin City			25 00
E. H. Rogers, Bunceton			20 00
J. R. Young, Richards			15 00
E. S. Byrne, Saxton			10 00
9. Sow, six and under twelve months—			
Winn & Mastin, Martin City	35 00	35 00	40 00
Winn & Mastin, Martin City	25 00	25 00	35 00
Wiley, Hoadley & Coleman, Sedalia			30 00
U. S. Byrne, Saxton			25 00
U. S. Byrne, Saxton			20 00
Geo. W. Falk, Richmond			15 00
Geo. W. Falk, Richmond			10 00
10. Sow, under six months—			
Winn & Mastin, Martin City	25 00	25 00	40 00
E. H. Rogers, Bunceton			35 00
H. L. Wiley, Sedalia			30 00
E. H. Rogers, Bunceton			25 00
U. S. Byrne, Saxton			20 00
U. S. Byrne, Saxton			15 00
Wiley, Hoadley & Coleman, Sedalia			10 00
11. Champion boar, one year or over—			
Winn & Mastin, Martin City	100 00	100 00	
13. Champion boar, under twelve months—			
Winn & Mastin, Martin City	75 00	75 00	
19. Grand champion boar, any age—			
Winn & Mastin, Martin City	150 00	150 00	
23. Four animals, either sex, any age, get of one sire—			
Winn & Mastin, Martin City	75 00	75 00	60 00
Winn & Mastin, Martin City			50 00
Geo. W. Falk, Richmond			40 00
U. S. Byrne, Saxton			30 00
24. Four animals, either sex, any age, produce of one sow—			
Winn & Mastin, Martin City	50 00	50 00	60 00
Wiley, Hoadley & Coleman, Sedalia			50 00
Geo. W. Falk, Richmond			40 00
Winn & Mastin, Martin City			30 00
25. Boar and three sows over one year—			
Winn & Mastin, Martin City	100 00	100 00	60 00
Winn & Mastin, Martin City	50 00	50 00	50 00
Geo. W. Falk, Richmond			40 00
26. Boar and three sows under one year—			
Winn & Mastin, Martin City	75 00	75 00	60 00
Winn & Mastin, Martin City	45 00	45 00	50 00
Wiley, Hoadley & Coleman, Sedalia			40 00
Geo. W. Falk, Richmond			30 00
27. Boar and three sows, one year or over, bred by exhibitor—			
Winn & Mastin, Martin City	200 00	200 00	
30. Barrow, six and under twelve months—			
Winn & Mastin, Martin City	30 00	30 00	20 00
Winn & Mastin, Martin City	15 00	15 00	15 00
31. Barrow, under six months—			
Winn & Mastin, Martin City	30 00	30 00	20 00
Winn & Mastin, Martin City	25 00	25 00	15 00
33. Three barrows, one year and under two—			
Winn & Mastin, Martin City	60 00	60 00	40 00
Winn & Mastin, Martin City	50 00	50 00	30 00
34. Three barrows, six and under twelve months—			
Winn & Mastin, Martin City	60 00	60 00	30 00
Winn & Mastin, Martin City	50 00	50 00	20 00
36. Barrow, any age—			
Winn & Mastin, Martin City	50 00	50 00	
37. Three barrows, any age—			
Winn & Mastin—Martin City	100 00	100 00	

CLASS LXV—BERKSHIRES.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
1. Boar, two years or over—			
N. H. Gentry, Sedalia	$60 00	$60 00	$40 00
June K. King, Marshall	....	....	35 00
Lee M. Gentry, Sedalia	....	....	30 00
N. H. Gentry, Sedalia	....	....	25 00
2. Boar, eighteen and under twenty-four months—			
N. H. Gentry, Sedalia	60 00	60 00	40 00
N. H. Gentry, Sedalia	50 00	50 00	35 00
3. Boar, twelve and under eighteen months—			
N. H. Gentry, Sedalia	60 00	60 00	40 00
E. G. Vaughn, New Bloomfield	40 00	40 00	35 00
June K. King, Marshall	30 00	30 00	30 00
June K. King, Marshall	25 00	25 00	25 00
J. T. Pollard, Fulton	....	....	20 00
Frost & Richardson, Moberly	....	....	15 00
E. G. Vaughn, New Bloomfield	....	....	10 00
4. Boar, six and under twelve months—			
N. H. Gentry, Sedalia	30 00	30 00	40 00
L. M. Gentry, Sedalia	....	....	35 00
N. H. Gentry, Sedalia	....	....	30 00
Frost & Richardson, Moberly	....	....	25 00
L. M. Gentry, Sedalia	....	....	20 00
E. G. Vaughn, New Bloomfield	....	....	15 00
J. T. Pollard, Fulton	....	....	10 00
5. Boar, under six months—			
N. H. Gentry, Sedalia	40 00	40 00	40 00
C. A. McCue, Auxvasse	....	....	35 00
C. H. Busch, Washington	....	....	30 00
J. T. Qurollo, Independence	....	....	25 00
L. M. Gentry, Sedalia	....	....	20 00
L. M. Gentry, Sedalia	....	....	15 00
J. Qurollo, Independence	....	....	10 00
6. Sow, two years or over—			
N. H. Gentry, Sedalia	60 00	60 00	40 00
N. H. Gentry, Sedalia	40 00	40 00	35 00
L. M. Gentry, Sedalia	30 00	30 00	30 00
L. M. Gentry, Sedalia	....	....	25 00
E. G. Vaughn, New Bloomfield	....	....	20 00
June K. King, Marshall	....	....	15 00
E. G. Vaughn, New Bloomfield	....	....	10 00
7. Sow, eighteen and under twenty-four months—			
N. H. Gentry, Sedalia	60 00	60 00	40 00
N. H. Gentry, Sedalia	40 00	40 00	35 00
L. M. Gentry, Sedalia	....	....	30 00
L. M. Gentry, Sedalia	....	....	25 00
8. Sow, twelve and under eighteen months—			
J. Qurollo, Independence	40 00	40 00	40 00
June K. King, Marshall	30 00	30 00	35 00
June K. King, Marshall	25 00	25 00	30 00
N. H. Gentry, Sedalia	....	....	25 00
Frost & Richardson, Moberly	....	....	20 00
Frost & Richardson, Moberly	....	....	15 00
N. H. Gentry, Sedalia	....	....	10 00
9. Sow, six and under twelve months—			
N. H. Gentry, Sedalia	....	....	40 00
N. H. Gentry, Sedalia	....	....	35 00
June K. King, Marshall	....	....	30 00
J. T. Pollard, Fulton	....	....	25 00
L. M. Gentry, Sedalia	....	....	20 00
J. T. Qurollo, Independence	....	....	15 00
J. Qurollo, Independence	....	....	10 00
10. Sow, under six months—			
N. H. Gentry, Sedalia	40 00	40 00	40 00
C. A. McCue, Auxvasse	35 00	35 00	35 00
N. H. Gentry, Sedalia	....	....	30 00
L. M. Gentry, Sedalia	....	....	25 00
L. M. Gentry, Sedalia	....	....	20 00
June K. King, Marshall	....	....	15 00
J. T. Pollard, Fulton	....	....	10 00
11. Champion boar, one year or over—			
N. H. Gentry, Sedalia	100 00	100 00	
15. Champion sow, one year or over—			
N. H. Gentry, Sedalia	100 00	100 00	
17. Champion sow, under twelve months—			
N. H. Gentry, Sedalia	75 00	75 00	

CLASS LXV—BERKSHIRES—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
19. Grand champion boar, any age—			
N. H. Gentry, Sedalia	150 00	150 00	
21. Grand champion sow, any age—			
N. H. Gentry, Sedalia	150 00	150 00	
23. Four animals, either sex, any age, get of one sire—			
N. H. Gentry, Sedalia	75 00	75 00	60 00
N. H. Gentry, Sedalia	60 00	60 00	50 00
June K. King, Marshall	....	....	40 00
E. G. Vaughn, New Bloomfield	....	....	30 00
24. Four animals, either sex, any age, produce of one sow—			
N. H. Gentry, Sedalia	50 00	50 00	60 00
N. H. Gentry, Sedalia	45 00	45 00	50 00
June K. King, Marshall	....	....	40 00
E. G. Vaughn, New Bloomfield	....	....	30 00
25. Boar and three sows over one year—			
N. H. Gentry, Sedalia	100 00	100 00	60 00
N. H. Gentry, Sedalia	75 00	75 00	50 00
June K. King, Marshall	30 00	30 00	40 00
E. G. Vaughn, New Bloomfield	....	....	30 00
26. Boar and three sows under one year—			
N. H. Gentry, Sedalia	35 00	35 00	60 00
J. Qurollo, Independence	....	....	50 00
N. H. Gentry, Sedalia	....	....	40 00
J. T. Pollard, Fulton	....	....	30 00
27. Boar and three sows, one year or over, bred by exhibitor—			
N. H. Gentry, Sedalia	200 00	200 00	100 00
N. H. Gentry, Sedalia	....	....	60 00
E. G. Vaughn, New Bloomfield	....	....	40 00
30. Barrow, one year and under two—			
N. H. Gentry, Sedalia	30 00	30 00	20 00
N. H. Gentry, Sedalia	....	....	15 00
L. M. Gentry, Sedalia	....	....	10 00
31. Barrow, six and under twelve months—			
N. H. Gentry, Sedalia	30 00	30 00	20 00
N. H. Gentry, Sedalia	25 00	25 00	15 00
L. M. Gentry, Sedalia	....	....	10 00
32. Barrow, under six months—			
N. H. Gentry, Sedalia	20 00	20 00	20 00
L. M. Gentry, Sedalia	....	....	15 00
N. H. Gentry, Sedalia	....	....	10 00
33. Three barrows, one year and under two—			
N. H. Gentry, Sedalia	60 00	60 00	40 00
N. H. Gentry, Sedalia	....	....	30 00
L. M. Gentry, Sedalia	....	....	20 00
34. Three barrows, six and under twelve months—			
N. H. Gentry, Sedalia	60 00	60 00	40 00
N. H. Gentry, Sedalia	....	....	30 00
L. M. Gentry, Sedalia	....	....	20 00
35. Three barrows, under six months—			
N. H. Gentry, Sedalia	30 00	30 00	30 00
Frost & Richardson, Moberly	25 00	25 00	20 00
N. H. Gentry, Sedalia	....	....	10 00
36. Champion barrow, any age—			
N. H. Gentry, Sedalia	50 00	50 00	
37. Champion three barrows, any age—			
N. H. Gentry, Sedalia	100 00	100 00	

CLASS LXVI—DUROC JERSEY.

1. Boar, two years or over—			
J. W. Woodburn, Maryville	....	....	$40 00
3. Boar, twelve and under eighteen months—			
McFarland Bros., Sedalia	....	....	40 00
J. C. Woodburn, Maryville	....	....	35 00
McFarland Bros., Sedalia	....	....	30 00
4. Boar, six and under twelve months—			
McFarland Bros., Sedalia	40 00	40 00	40 00
Powell & Rudy, Smithton	20 00	20 00	35 00
B. W. Harned, Beaman	....	....	30 00

CLASS LXVI—DUROC JERSEY—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
5. Boar, under six months—			
F. L. Bowman, Hamilton	....	....	40 00
J. C. Woodburn, Maryville	....	....	35 00
McFarland Bros., Sedalia	....	....	25 00
C. Folgate, Stanberry	....	....	30 00
B. W. Barnett, Beaman	....	....	20 00
F. L. Bowman, Hamilton	....	....	15 00
C. Folgate, Stanberry	....	....	10 00
6. Sow, two years or over—			
McFarland Bros., Sedalia	60 00	60 00	40 00
McFarland Bros., Sedalia	....	....	35 00
7. Sow, eighteen and under twenty-four months—			
McFarland Bros., Sedalia	50 00	50 00	40 00
8. Sow, twelve and under eighteen months—			
McFarland Bros., Sedalia	30 00	30 00	40 00
McFarland Bros., Sedalia	....	....	35 00
F. L. Bowman, Hamilton	....	....	30 00
9. Sow, six and under twelve months—			
Powell & Rudy, Smithton	....	....	40 00
McFarland Bros., Sedalia	....	....	35 00
B. W. Harned, Beaman	....	....	30 00
B. W. Harned, Beaman	....	....	25 00
Powell & Rudy, Smithton	....	....	20 00
McFarland Bros., Sedalia	....	....	15 00
10. Sow, under six months—			
McFarland Bros., Sedalia	....	....	40 00
McFarland Bros., Sedalia	....	....	10 00
F. L. Bowman, Hamilton	....	....	30 00
B. W. Harned, Beaman	....	....	25 00
F. L. Bowman, Hamilton	....	....	20 00
B. W. Harned, Beaman	....	....	15 00
J. C. Woodburn, Maryville	....	....	10 00
15. Champion sow, one year or over—			
McFarland Bros., Sedalia	100 00	100 00	
21. Grand champion sow, any age—			
McFarland Bros., Sedalia	150 00	150 00	
23. Four animals, either sex, any age, get of one sire—			
McFarland Bros., Sedalia	....	....	60 00
Powell & Rudy, Smithton	....	....	50 00
F. L. Bowman, Hamilton	....	....	40 00
B. W. Harned, Beaman	....	....	30 00
24. Four animals, either sex, any age, produce of one sow—			
McFarland Bros., Sedalia	....	....	60 00
Powell & Rudy, Smithton	....	....	50 00
F. L. Bowman, Hamilton	....	....	40 00
C. F. Folgate, Stanberry	....	....	30 00
25. Boar and three sows, over one year—			
McFarland Bros., Sedalia	50 00	50 00	60 00
26. Boar and three sows, under one year—			
McFarland Bros., Sedalia	25 00	25 00	60 00
Powell & Rudy, Smithton	....	....	50 00
B. W. Harned, Beaman	....	....	40 00
F. L. Bowman, Hamilton	....	....	30 00
27. Boar and three sows, one year or over, bred by exhibitor—			
McFarland Bros., Sedalia	....	....	100 00

CLASS LXVII—CHESTER WHITE.

1. Boar, two years or over—			
L. L. Frost, Mirabile	$60 00	$60 00	$40 00
O. Kerr, Independence	50 00	50 00	35 00
W. W. Waltmeyer, Raymore	....	....	30 00
2. Boar, eighteen and under twenty-four months—			
L. L. Frost, Mirabile	40 00	40 00	40 00
3. Boar, twelve and under eighteen months—			
L. L. Frost, Mirabile	50 00	50 00	40 00
O. L. Kerr, Independence	30 00	30 00	35 00
C. M. Kerr, Independence	....	....	30 00
O. L. Kerr, Independence	....	....	25 00
W. W. Waltmeyer, Raymore	....	....	20 00
L. L. Frost, Mirabile	....	....	15 00

CLASS LXVII—CHESTER WHITE—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
4. Boar, six and under twelve months—			
C. M. Kerr, Independence			40 00
O. L. Kerr, Independence			35 00
L. L. Frost, Mirabile			30 00
W. W. Waltmeyer, Raymore			25 00
O. L. Kerr, Independence			20 00
L. L. Frost, Mirabile			15 00
5. Boar, under six months—			
O. L. Kerr, Independence	35 00	35 00	40 00
Nunnelly Bros., Readsville	25 00	25 00	35 00
L. L. Frost, Mirabile			30 00
Nunnelly Bros., Readsville			25 00
C. M. Kerr, Independence			20 00
C. M. Kerr, Independence			15 00
L. L. Frost, Mirabile			10 00
6. Sow, two years or over—			
O. L. Kerr, Independence			40 00
W. W. Waltmeyer, Raymore			35 00
L. L. Frost, Mirabile			30 00
L. L. Frost, Mirabile			25 00
7. Sow, eighteen and under twenty-four months—			
L. L. Frost, Mirabile			40 00
W. W. Waltmeyer, Raymore			35 00
O. L. Kerr, Independence			30 00
L. L. Frost, Mirabile			25 00
8. Sow, twelve and under eighteen months—			
O. L. Kerr, Independence	25 00	25 00	40 00
L. L. Frost, Mirabile			35 00
L. L. Frost, Mirabile			30 00
O. L. Kerr, Independence			25 00
W. W. Waltmeyer, Raymore			20 00
9. Sow, six and under twelve months—			
L. L. Frost, Mirabile			40 00
O. L. Kerr, Independence			35 00
W. W. Waltmeyer, Raymore			30 00
L. L. Frost, Mirabile			25 00
C. M. Kerr, Independence			20 00
O. L. Kerr, Independence			15 00
10. Sow, under six months—			
L. L. Frost, Mirabile	35 00	35 00	40 00
O. L. Kerr, Independence			35 00
L. L. Frost, Mirabile			30 00
C. M. Kerr, Independence			25 00
O. L. Kerr, Independence			20 00
W. W. Waltmeyer, Raymore			15 00
C. M. Kerr, Independence			10 00
11. Champion boar, one year or over—			
L. L. Frost, Mirabile	100 00	100 00	
12. Grand champion boar, any age—			
L. L. Frost, Mirabile	150 00	150 00	
23. Four animals, either sex, any age, get of one sire—			
L. L. Frost, Mirabile			60 00
O. L. Kerr, Independence			50 00
Nunnelly Bros., Readsville			40 00
W. W. Waltmeyer, Raymore			30 00
24. Four animals, either sex, any age, produce of one sow—			
O. L. Kerr, Independence	30 00	30 00	60 00
Nunnelly Bros., Readsville			50 00
W. W. Waltmeyer, Raymore			40 00
C. M. Kerr, Independence			30 00
25. Boar and three sows, over one year—			
L. L. Frost, Mirabile			60 00
O. L. Kerr, Independence			50 00
L. L. Frost, Mirabile			40 00
W. W. Waltmeyer, Raymore			30 00
26. Boar and three sows, under one year—			
L. L. Frost, Mirabile	25 00	25 00	60 00
L. L. Frost, Mirabile			50 00
O. L. Kerr, Independence			40 00
C. M. Kerr, Independence			30 00
27. Boar and three sows, one year or over, bred by exhibitor—			
L. L. Frost, Mirabile			100 00
L. L. Frost, Mirabile			50 00
W. W. Waltmeyer, Raymore			40 00

CLASS LXVII—CHESTER WHITE—Continued.

	World's Fair prize.	Duplicate paid by Missouri.	State premium.
30. Barrow, one year and under two—			
L. L. Frost, Mirabile	....	....	20 00
L. L. Frost, Mirabile	....	....	15 00
31. Barrow, six and under twelve months—			
L. L. Frost, Mirabile	....	....	20 00
L. L. Frost, Mirabile	....	....	15 00
32. Barrow, under six months—			
L. L. Frost, Mirabile	20 00	20 00	20 00
L. L. Frost, Mirabile	15 00	15 00	15 00
33. Three barrows, one year and under two—			
L. L. Frost, Mirabile	....	....	40 00
34. Three barrows, six and under twelve months—			
L. L. Frost, Mirabile	40 00	40 00	40 00
35. Three barrows, under six months—			
L. L. Frost, Mirabile	40 00	40 00	30 00

PRIZES AWARDED—BUTTER AND CHEESE.

The State received a grand prize for the magnificent butter display and a silver medal on the big, three thousand pound Altamont cheese. The following cash prizes were awarded Missouri butter and cheese on scores made:

BUTTER AND CHEESE PREMIUMS.

JULY SCORING.

DAIRY BUTTER.

Exhibitor.	Post Office.	Score	Premium.	Amt.
Mrs. E. Drennen & Sons	Boonville	92	First	$20 00
T. E. Dunphey	Nevada	89	Half of second	7 50
Mrs. W. H. Hatch	Hannibal	89	Half of second	7 50
J. C. Hiller	Springfield	88	Half of third	5 00
Mrs. J. A. Bixler	Monroe City	88	Half of third	5 00
Mrs. W. A. Stapleton	Albany	87	Fourth of fourth	1 25
C. J. Oswald	Asbury	87	Fourth of fourth	1 25
J. A. Humphrey	Marshfield	87	Fourth of fourth	1 25
J. H. Cornell & Sons	Marshfield	87	Fourth of fourth	1 25

CREAMERY BUTTER

W. S. Dille	Holden	94	Half of first	$10 00
Emma Creamery Co.	Emma	94	Half of first	10 00
J. D. Ahrens	Concordia	93	Second	15 00
Corder Creamery Co.	Corder	93	Third	10 00
Carl J. Walker	St. Joseph	92	Fourth	5 00

CHEESE.

Geo. A. Bayles	St. Louis	95	First	$20 00
W. T. McCaskey	Altamont	89	Second	15 00
Gem Cheese Co.	Cameron	88	Third	10 00
McCaskey Bros	Pattonsburg	87	Fourth	5 00

SEPTEMBER SCORING.

DAIRY BUTTER.

Exhibitor.	Post Office.	Score	Premium.	Amt.
W. T. Atkinson	Marshfield	91	Half of first	$10 00
Mrs. Wm. H. Hatch	Hannibal	91	Half of first	10 00
J. E. Lizenby	Brookfield	90	Third of second	5 00
T. E. Dunphey	Nevada	90	Third of second	5 00
E. R. Melkersman	Boonville	90	Third of second	5 00
Mrs. W. A. Stapleton	Albany	89	Third	10 00
J. C. Hiller	Springfield	88	Fourth	5 00

CREAMERY BUTTER.

W. S. Dille	Holden	94	First	$20 00
Corder Creamery Co	Corder	93	Half of second	7 50
Sweet Springs Creamery Co	Sweet Springs	93	Half of second	7 50
Emma Creamery Co	Emma	92	Third	10 00
C. J. Walker	St. Joseph	91	Fourth	5 00

CHEESE.

Geo. A. Bayles	St. Louis N. 2d st	97	First	$20 00
R. T. McCaskey	Altamont	90	Half of second	7 50
J. L. Musselman	Altamont	90	Half of second	7 50
Gem Cheese Co	Cameron	85	Third	10 00

(As there were only four entries, and two of them were ties, there is no fourth premium to pay.

OCTOBER SCORING.

DAIRY BUTTER.

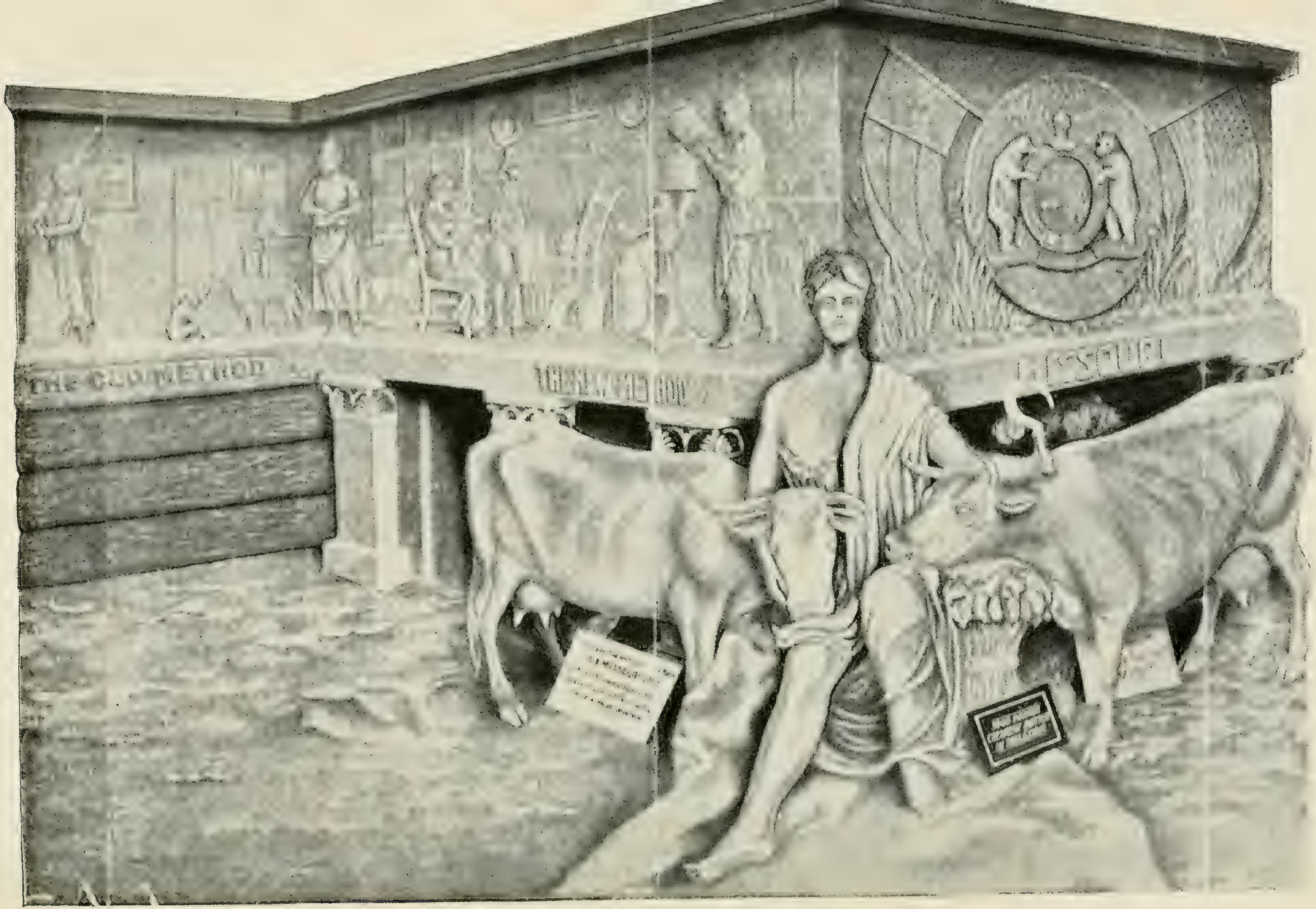
E. R. Melkersman	Boonville	94	First	$20 00
T. E. Dunphey	Nevada	93	Second	15 00
Mrs. W. P. Stapleton	Albany	92	Third	10 00
W. T. Atkinson & Son	Marshfield	91	Fourth	5 00

CREAMERY BUTTER.

J. D. Ahrens	Concordia	93	Half of first	$10 00
W. S. Dille	Holden	93	Half of first	10 00
Emma Creamery Co	Emma	91	Fourth of second	3 75
C. H. Heseman	Billings	91	Fourth of second	3 75
J. G. McPheeters Meriden Cr. Co	Kansas City	91	Fourth of second	3 75
Sweet Springs Creamery Co	Sweet Springs	91	Fourth of second	3 75
Wm. Mueller	Frohna	89	Half of third	5 00
C. J. Walker	St. Joseph	89	Half of third	5 00
Chas. Dierking	Emma	88	Half of fourth	2 50
J. B. Dunlap	Butler	88	Half of fourth	2 50

CHEESE.

J. L. Musselman	Altamont	95	Half of first	$10 00
Geo. Bayles	St. Louis	95	Half of first	10 00
R. T. McCaskey	Altamont	93	Second	15 00
C. C. McRea	Cameron	92	Third	10 00
R. V. Montgomery, care of Gem Cheese Co.	Cameron	84	Half of fourth	2 50
Mrs. N. S. Wyckoff	Unionville	84	Half of fourth	2 50



Missouri's Butter Exhibit, St. Louis, World's Fair.

PRO RATA FUND.

This fund consisted of four hundred dollars, which was divided among all Missouri butter and cheese exhibitors, except those getting first and second premiums, in proportion to their total scores. This was paid as a further encouragement in inducing our people to make dairy exhibits and in pursuance of this arrangement the following distribution was made and paid, viz.:

C. J. Walker, St. Joseph	$23 80
Mrs. W. P. Stapleton, Albany	23 55
J. C. Miller, Springfield	23 00
Mrs. J. A. Bixler, Monroe City	22 90
F. E. Headley, Springfield	22 80
R. V. Montgomery, Cameron	22 48
J. H. Cornell & Son, Marshfield	15 32
McCaskey Bros, Pattonsburg	14 78
H. E. Green, Columbia	13 57
Mrs. N. S. Wyckoff, Unionville	13 47
C. C. McRea, Cameron	8 05
Chas. Ackman, Mexico	7 88
Billings Creamery Co., Billings	7 78
Mueller & Son, Frohna	7 78
Clinton Creamery Co., Clinton	7 70
Chas. Deirking, Emma	7 70
J. B. Dunlap, Butler	7 70
C. J. Oswald, Asbury	7 62
J. A. Humphrey, Marshfield	7 62
S. H. Pile, Glasgow	7 57
S. W. Coleman, Sedalia	7 52
Stewartsville Creamery Co., Stewartsville	7 52
G. A. Meyer, Sweet Springs	7 52
B. N. Rohrer, Hannibal	7 52
Squire Innis, Nevada	7 48
John T. Bruns, Concordia	7 44
Mary E. Huff, Bethany	7 44
E. D. White, Clarksdale	7 44
W. A. Davis, Oakwood	7 44
Saline County Creamery Co., Marshall	7 43
H. H. Hyland, Lamar	7 35
E. J. Shelpman, Springfield	7 35
W. T. Jones, New Cambria	7 26
A. J. Girdner, Princeton	7 17
J. E. Shirk, Linneus	7 08
R. S. Trachsel, Helena	7 00
S. H. Hammond, Mabel	6 82

STATEMENT.

In compliance with a custom of the Board of Agriculture, we take pleasure in publishing in the following pages a condensed report of the Fifteenth Annual Meeting of the State Dairy Association. This was the most important meeting, in many respects, in the history of the Association. A very large attendance was on hand at every session from the first until the very last and the greatest enthusiasm prevailed. This augurs well for the development of the dairy business in Missouri.

While we print in this report a synopsis only of those addresses and the discussions which are of the most practical benefit, we beg to mention herewith the names of the different persons who took part in the program and assisted in making the meeting a success, but whose addresses are not included in this report, for lack of space.

Hon. W. W. Marple .... St. Joseph, Mo.
"President's Annual Address."

Prof. C. B. Lane, Chief Dairy Division .... Washington, D. C.
"Work of National Dairy Department."

Mrs. Nellie Kedzie Jones .... Kalamazoo, Michigan.
"School, the Ally of the Home."
[This excellent address will be printed in a special bulletin.]

Hon. U. S. Baer, Asst. Dairy Commissioner .... Madison, Wisconsin
"Cheese Making."

Mr. Geo. B. Ellis, Secretary Board of Agriculture .... Columbia, Mo.
"The Problem of Education for the Farmer."

Mr. W. H. Phipps .... Wichita, Kansas.
"A Greeting from Kansas."

Mr. L. E. Cline .... Columbia, Missouri.
"Care of Milk from a Bacteriological Standpoint."

Dr. Walter Bernays, City Chemist .... St. Louis, Missouri.
"Milk Inspection."

Mr. John Patterson .... Kirksville, Missouri.
"Reminiscences."

Mr. R. H. Pethebridge .... St. Louis, Missouri.
"Missouri's Need of a Dairy Commissioner."

Mr. C. T. Graves .... Maitland, Missouri.
"The World's Fair Dairy Contest."

Mr. C. W. Green .... Brookfield, Missouri.
"Address of Welcome."

Mr. L. G. Humbarger .... St. Joseph, Missouri.
"Response to Address of Welcome."

Mr. White .... Brookfield, Missouri.
"Address on Behalf of Merchants' Association."

Missouri State Dairy Association.

A condensed report of the proceedings of the fifteenth annual meeting held in Brookfield, February 15, 16, 17, 1905.

THE BUSINESS COW FOR THE BUSINESS DAIRYMAN.

(Prof. R. M. Washburn, Dept. Dairy Husbandry, Columbia, Missouri.)

Mr. Chairman, Ladies and Gentlemen:

It is not my intention to detain you very long this morning as there are men of more years, more experience and more general ability to follow.

There are some features of the work, however, that I think it will be well for us to look into. I am always reminded when I begin to speak on this subject of how prone we all are never to recognize the opportunities that we have until we have been off and seen what the other fellow has. It is a common occurrence that the boy on the farm does not recognize or appreciate the advantages that he has until he has gone out into the world and tried to win his place in the world; then he returns quite well satisfied that the old farm is not such a bad place after all.

If any of you were to visit Minneapolis or Saint Paul, one of the first things you would go to see would be the falls of Minnehaha, so beautifully described in the poetry of Longfellow, but those who live near those falls do not appreciate them. I was a grown man myself before I saw them although I was raised near them. It became my pleasure recently to visit the eastern states, and I had not been in Philadelphia two hours before I went to see old Liberty Bell, but many of those who live near it have never seen it.

Naturally, coming from a dairy family and a dairy state, with a dairy education and a dairy purpose in mind and heart, I was looking at the eastern states to see how they were educated to dairy work; I was interested to see how dairying was made to pay in the eastern states. One farmer was making money on a run down farm by feeding his cows well on western corn, and grain and by-products of the western mills, and selling milk in the city. He was gaining steadily and improving his land all the time. In some other districts I noticed a great lack of what we would call energy, but I was impressed with the

fact that it requires more gray matter for the eastern farmer to make a living than for the western farmer. If the eastern farmer did not use his head any more than the average western farmer he would starve. They have to study the problem of how to build the soil as well as how to grow and market their crops.

MISSOURI'S ADVANTAGES FOR DAIRYING.

Last spring I was called to this State to do dairy work, and I came with the dairy interest at heart, and entered the State with enthusiasm. I saw your fertile fields and beautiful pastures and was impressed with the advantages of Missouri as a dairy State, located as she is in the center of the United States and with such unbounded fertility in her soil, and I thought there ought to be something done with Missouri in the dairy line, and was green enough to think that I could induce Missourians to go into it. I then found that Missouri did not even supply her own people with dairy products, but imported them from northern states, states no better fitted for dairying than Missouri, and frequently not so well, having longer, colder winters and shorter summers. I found that Missouri with all these advantages was sending north many thousands of dollars annually to buy cheese and butter which could be produced cheaper here than in states further north. Frequently during the fall while over the State with farmers' institutes, I inquired of individuals the price of cheese and found it to be twenty cents a pound the State over. What was the local dealer paying for it? It passed through several hands coming through the big cities, and he was paying from twelve to fourteen cents a pound for it. What was the farmer back in Wisconsin getting for it? Back there where they were making money and becoming independent producing this cheese they were receiving from nine to ten cents a pound, for that which the Missourian paid twenty cents a pound, and which could be produced right here more cheaply than there. This is not poetry but plain fact that can be verified at any time. They say that Missouri cannot produce good cheese, but I am satisfied that they are mistaken.

MAINTAINING SOIL FERTILITY.

Not only is there money in the dairy business, if it is carried on intelligently, so far as the business is concerned, but as Prof. Lane mentioned, it has important influence upon the soil. If one should be put on a poor, sandy or run down soil and, as some people have done, invested all their worldly goods in some impoverished soil, not knowing that it was impoverished, he would be compelled to study fertility and would soon recognize that our present manner of tilling the land is extravagant, and that we are losing our fertility rapidly from the fact that

we sell from the farm that which has a large part of the farm in it. I will give you a few figures. Every farmer should realize that with every dollar's worth of wheat sold—wheat being worth 80 or 85 cents a bushel, average price, considering the fertility value of that wheat to be on the same basis as a chemical fertilizer that he would have to purchase, and which eastern farmers are purchasing in large quantities—for every dollar's worth of wheat sold from the farm about thirty cents of the farm goes with it; but for every dollar's worth of butter less than one-half cent of the farm is lost. A big difference. Under the grain system the farm continually deteriorates in value while with dairy farming it becomes more valuable constantly.

THE BUSINESS COW.

Now let us suppose that you have been converted by these few words and are going into the dairy business. The first question naturally, and still asked over the State is, "Which breed of cows shall I keep?"

Table I contains some interesting figures. It is not a pile of guess work, but actual figures obtained from careful scientific tests—and by scientific tests I do not mean a lot of nonsense, I mean careful exact work, for that is what scientific work is. All the cows of these different breeds were pure bred, were fed at the same time, during the same four years, in the same fields by the same dairymen, and received the same feeds. So you see everything except the breed and the personal qualities of all these animals was identical. This breed individuality and the individuality of the cows we will now consider.

TABLE I.

Description of Cow.	Pounds of milk produced per year.	Pounds of butter produced per year.	Cost of feed.	Net profit.
Best Holstein	12,111	538	$29 83	$97 15
Poorest Holstein	6,667	246	21 71	38 16
Difference			8 12	58 99
Best Shorthorn	9,896	474	27 38	83 25
2nd best Shorthorn	9,326	449	23 52	81 20
3rd best Shorthorn	8,046	381	24 82	64 25
Average				76 23
Poorest Shorthorn	3,059	129	23 83	6 86
2nd poorest Shorthorn	2,833	134	21 30	10 03
3rd poorest Shorthorn	2,796	125	18 84	10 63
Average				9 17
Best Red Poll	7,225	361	25 32	58 44
Poorest Red Poll	5,249	236	25 24	30 36
Difference			00 08	28 08
Best Jersey	6,523	532	26 26	90 58
Poorest Jersey	4,087	236	18 54	35 20
Difference			7 72	52 38

Take the best Holstein. She produced 12,111 pounds of milk and 538 pounds of butter in a year and the cost of her feed was $29.83. Let us figure a little. Suppose we get twenty cents a pound for her butter. Then take four-fifths of the milk as skim milk and allowing twenty cents a hundred pounds as its value, then adding the value of the butter and skim milk and subtracting the cost of her food for the year we have our net profit. Whether these prices meet your approval or not we will hold these figures to that basis, subjecting the produce of each cow to the same test. Subtracting from the price received for her butter and the skimmed milk the board bill of this cow and we have a profit of $97.15. That is the money we receive for the actual work done by us on this cow, and the interest on the capital invested in the cow and stables.

Take the poorest Holstein cow. She produced 6,667 pounds of milk and 246 pounds of butter and cost $21.71, making a profit of $38.16. Notice, there is a difference of $58.99 between the net profit of these two cows, both pure Holsteins, and a difference of only $8.12 in the cost of feed.

Take the Shorthorns, arranged in groups of three. The best Shorthorn gave 9,896 pounds of milk and 474 pounds of butter and cost for her keeping $27.38. The average profit for these best three cows was $76.23 at the same rate of figuring as above.

Of the poorest three Shorthorns, one made a profit of $10.63, the second poorest $10.03, and the poorest $6.86.

There is a very interesting point right here. The poorest cow made a little money, $6.86 for the whole year. Suppose we figure the cost in work of that $6.86. Allowing that you are a good milker—which most milkers are not—it will take five minutes to do each milking. This is pretty quick work but a man can do it if he goes at it right. That makes ten minutes a day at milking. Suppose she gives milk for ten months in the year—how much time will be spent in the mere process of extracting that milk? 50 hours. Suppose she is dry for two months of the year, even then she will need to be cared for. It ought not to be unreasonable to suppose the care of a cow would take ten minutes a day for six months, or thirty hours for the entire year. I do not think you can care for your cows in less time than that, considering the cleaning and repairing of stables, and feeding and watering the cows, the building and repairing of the fences, etc. That makes us 80 hours of work for $6.86 or 8.6 cents an hour or 86 cents a day, while the same amount of work bestowed on a cow like the first would return a wage of $1.22 an hour, or at the rate of $12.20 a day. Please understand me when I say that in this country at the present time, in the ordinary dairy herd of

fifteen or twenty cows, the addition of a good cow would not be worth as much as a sharp lead pencil.

THE BUSINESS DAIRYMAN.

Right here I shall take the liberty of turning my subject around, making it read, "The Business Dairyman for the Business Cow."

There is a difference in profit not only with different breeds but also with different individual cows of the same breed. I want you to compare the best Shorthorn, which we consider a dual purpose or beef animal, with the poorest one of the best dairy breeds in the world. The profit on the best Shorthorn was $83.25, while the profit on the poorest Holstein was only $38.16 for the year. The poorest Shorthorn made only 125 pounds of butter in a year. What business had she to be classed as a dairy cow? But the poorest Holstein made only 246 pounds of butter in the year and she was a full blooded Holstein. The best Holstein at the St. Louis cow demonstration made 329.7 pounds of butter in four months or twice as much as the average cow gives in a whole year, while the best Jersey at St. Louis was but a shadow behind in the quantity of butter produced.

Now I do not say that every farmer could have a cow like either of these, because there are not cows enough like these to go around, but when cows are capable of making such records as these, it shows us that we ought to be ashamed to keep in the dairy a cow that will give only 125 pounds of butter in a year, or what the average Missouri cow does, 130 pounds a year. It takes a business man to get down into the business and conduct it in a businesslike manner. A better cow is all right, but a better dairyman is still better, because he can think.

Of the Red Polls the best cow gave for the year 7,225 pounds of milk and 361 pounds of butter, while the poorest one gave 5,249 pounds of milk and 236 pounds of butter. The profit on the best cow was $58.44, while the profit on the poorest cow was only $30.36, a difference of $28.08, with a difference of only eight cents in the cost of their feed for the entire year. The difference was not in the breed, nor in the care and management of the cows, nor the time of the year, but the difference was in the cows. It is not the breed nor the pedigree, but the cow that must eat the feed and give the milk. Keep your dairy herd on that basis and cull out the poorest ones; there is wonderful room for improvement.

The best Jersey gave 6,523 pounds of milk, less than the poorest Holstein, but she gave 532 pounds of butter, as against 538 given by the best Holstein. It costs a little less to keep her than the best Holstein and her annual net income was $90.58 as compared with $97.15 for the best

Holstein.' I did not consider the value of the calf because its value varies so much in different communities. Some of your finest beef calves, if vealed, would not bring enough money to pay for the milk they drink, and if you figure on the cost of their feed to make baby beef, you come out with a very small margin. We placed all the cows under the the same conditions, except that I did not consider the comparison of solids, not fat in the milk of the Holsteins and Jerseys. This done the Jersey would very closely approach the Holstein in net profit.

The poorest Jersey made a profit of only a little over $35, the best Holstein $97, while the poorest Holstein made only $38.16, as against $90.58 for the best Jersey. Again I must emphasize the fact that it is not the breed but the cow that does the business. I do not hesitate to say that you find the same comparison of good cows and poor cows in all breeds. You will, of course, find a far larger per cent of dairy cows among dairy breeds, but sometimes a scrub bred will produce more butter fat than a dairy-bred cow. Take a dairy cow and feed her in a scrub barn, on rough feed, not developing her capacity to give milk till she is a mother, and she cannot hold her own with a well developed native. Of course you find a larger per cent of profitable cows among the dairy breeds; they have been bred that way for hundreds of years, but the very fact that they are Jerseys or Holsteins does not guarantee that they are going to be money makers.

DISCUSSION.

Mr. Mallory—I do not believe we have any business in figuring on these poorest cows.

Mr. Washburn—Yes we have, we want to know them so as to get rid of them.

QUANTITY AND QUALITY.

Only a few days ago I was teaching our boys in the short course the scoring and judging of cows. I was telling them the points they must look for in the cow that would do business. We emphasized capacity and disposition, then we took our little score cards made out on that basis and went down to the barn to score some cows. We went to one cow that I gave full credit on capacity and on the milk giving organs, but she had a heavy short neck, heavy thighs, thick and short body all over. I gave her all I could; I knew she looked like a pretty good business animal. She scored 85. We scored another cow. She had a beautiful dairy type, slender neck, prominent spines, thin covering of the shoulder blades, loins strong, udder nearly perfect, a good disposition, and very good capacity for food. She scored 89. But we were not

A herd of Brown Swiss Cows, bred and owned by Harry McCullough, Fayette, Missouri. This herd took a large number of prizes at St. Louis World's Fair. The cow at extreme right made a record of 61 pounds of milk per day from January 15 to February 15.

satisfied with this. We went to the dairy milk sheet. Here we found our pretty cow giving thirty pounds of milk per day, and the fat one only ten pounds. But how long had each been in milk? The thirty pound cow only three months, while the ten pound cow had been milking one even year. That puts another face on the matter. Yet we were not satisfied. We did what every business dairyman should do—tested the milk of each cow for butter fat. Result: Our pretty cow tested only 2 per cent, while the fat one tested 7.4 per cent. Which has been doing the more work? Let us see:

Pretty cow, 30 lbs. x 2 per cent = .6 lbs. of butter fat per day.

Fat cow, 10 lbs. x 7.4 per cent = .74 lbs. butter fat per day.

And that after she had been working one year against the other three months. When the 2 per cent cow freshens again she may raise the test to 2.5 per cent, or even 2.6 per cent, but it is very doubtful if she ever reaches even 3 per cent.

THE QUESTION OF BREED.

Mr. Mallory—If I am going into the dairy business what breed will secure the best dairy cows in my herd?

Mr. Washburn—A live question, which must be answered by the farmer or dairyman himself, largely according to the kind of dairying he is going into. I honestly believe that a man cannot afford to keep Jerseys if he must sell his milk in town at the same price per quart that the Holstein man is receiving for his. Also the man who has only Holsteins in his dairy is likely to hear complaints from his customers on account of poor milk. A herd composed of one-fourth or one-third Jersey or Jersey grades and the remainder Holstein or Holstein grades is pretty sure to supply milk of a good quality.

If the cream is to be sent to a creamery where it is paid for by the butter fat test, or if butter is made on the farm, the question is, "Which breed of dairy cows, Ayrshire, Guernsey, Holstein or Jersey will produce butter fat the most cheaply? This is a much disputed point, and one which, in my opinion, will remain such for a long time to come. As you have seen pure dairy bred cows vary greatly in their powers to produce, and the powers of their managers to make them produce varies even more greatly. Naturally then, any test with a limited number of cows, for a limited number of days is very likely to include such personal qualities of cow or man or both, tending one way or the other to such an extent that the broader qualities of the breeds, as breeds, are less distinctly shown than one could wish.

There is probably no breed of cows in the world that will, with good care, produce butter fat any more cheaply than the Jersey; but if a man cannot control his temper, or his hired man, or if he does not like this naturally nervous, intelligent little breed, he would undoubtedly do better with the less sensitive Holsteins. Again, if good abundant pasture cannot be secured, if the cows are compelled to ramble long distances over rough land, it is quite probable that either the Ayrshire or Brown Swiss will do better than either Jersey or Holstein. Under ideal conditions of feed and management the Holsteins and the Jerseys as economical producers are just about a draw.

THE FARMER'S DAIRY COW.

(Hon. A. J. Glover, Associate Editor "Hoard's Dairyman," Fort Atkinson, Wisconsin.)

For over three years the Department of Dairy Husbandry of the University of Illinois has been conducting field work among the dairymen of the State. A number of them were persuaded to weigh and sample each mess of milk a sufficient number of times during the year so that the performance of each cow could be estimated with a considerable degree of accuracy. It has been demonstrated by a number of our experiment stations that many cows are kept in the dairy at a very small profit, and some at an actual loss. In order to determine the facts and to lead the dairymen to realize their full force and meaning a man was sent into the field to persuade a number of them to keep a record of every cow in their herds. While this paper gives no facts new to science, yet it presents a line of work on which we have but little data and it brings the farmers face to face with the facts that exist upon their own farms. It shows them that some herds are kept at a good profit, some at a small profit and others at an actual loss.

HOW THE FARM TEST WAS MADE.

The farmers who took up this work were required to weigh and sample the milk from each cow in the herd every seventh week for fourteen consecutive milkings. After each cow was milked the milk was poured into a weighing pail, weighed and the weight recorded on a milk sheet directly under the cow's name. A small sample of milk is then taken with a sample dipper or a milk thief and put into the sample bottles. Corrosive sublimate tablets were used to preserve the samples of milk. Instructions were given to each man to shake the composite samples each day so as to mix the fresh samples with the rest of the milk and keep

the cream from becoming dry or hard on the sides of the bottle. The jars that were used for keeping the composite samples were one-half pint, tin top, covered bottles. When the period of weighing and sampling was completed, the samples were tested either on the farm or at the creamery.

CALCULATING THE AMOUNT OF MILK AND BUTTER FAT.

The milk was weighed and sampled during the fourth week of the seven-weeks period. From the total amount of milk that each cow gave during this time, and the per cent of fat, was calculated the amount of butter fat produced in the week. From these results were estimated the amount of milk and butter fat each cow produced during the three weeks before, and the three weeks following the test. The cow's yearly record was made up from these tests, and in this way the total amount of milk and butter fat that she produced during the entire year was determined. It may be objected to that this method did not secure results absolutely correct. On this it may be said that the chief object was to secure data from which cows could be compared with each other, and that this object was fully attained even though the totals may have been either slightly too large or too small. Check methods show, however, that the data are very close to the actual amounts produced. In many cases the dairymen also kept an approximate account of the grain and roughage that each cow consumed during the year. Where this was done the records are of exceptionally high value, for they clearly show the profit or loss of every cow kept in the dairy.

Ten dairy herds, namely A, B, C, E, F, I, J, L, M and N, have been tested for two years and I will give you the summary of the ten herds and a detailed report of two dairies. In the ten herds 145 cows completed their second year's work. The best cow gave an average yield of 7,190 pounds of milk, 367 pounds of butter fat, and 428 pounds of butter. The poorest matured cow gave an average yield of 4,560 pounds of milk, 135 pounds of butter fat and 158 pounds of butter.

In the first two years the average production of the herds was: 4,944 pounds of milk, 201 pounds of butter fat, and 235 pounds of butter.

The average production for the two years was: 5,261 pounds of milk, 214 pounds of butter fat and 249 pounds of butter.

Herd "A" made the greatest increase in the second year's test. It produced 1,285 pounds more milk and 60 pounds more butter fat per cow than it did in the first year's work. The percentage of increase was: 32.4 per cent of milk and 42.5 per cent of butter fat.

In herd "B" there was a small decrease in the second year's test,

it gave 61 pounds less milk and 5 pounds less butter fat per cow than in the first year's test. All the herds except "E" in the second year's test, showed an increased yield of milk and butter fat over the first year.

The average percentage of increase in the second year, per cow, was 13.7 per cent of milk and 13.9 per cent of butter fat.

In other words, the average increase per cow was: 667 pounds of milk, 28 pounds of butter fat, and 32 pounds of butter.

The increase seems to be due to the following:

(1) The cows on the whole received better care.

(2) The herds were fed better rations.

(3) From nearly all the herds a few poor cows were sold.

(4) In some cases cows were purchased that proved to be good dairy animals.

I shall give a report of herds "A" and "F." It should be observed that great improvement was made in each of these dairies.

REPORT OF HERD "A"

At the end of the first year's test the owner of this herd disposed of a few of the poorest cows, but the herd still contained many poor dairy animals. The herd was composed of natives, grade Holsteins, and grade Shorthorns, which were by no means of the dairy type. The cows were in better condition during the second year than they were in the first year's test.

In the second year the herd received a better ration, the rough fodder was about the same, but the meal portion of the ration consisted of shorts and Peoria gluten, instead of corn meal and ground rye which were the chief concentrates during the first year. The kind of concentrates and roughage fed during the two years was as follows:

First year:	Second year:
Corn meal.	Shorts.
Ground rye.	Peoria gluten.
Ground oats.	Corn stover.
Crushed corn and cob meal.	Corn silage.
Corn silage.	Timothy hay.
Timothy hay.	

It will be seen as was reported in bulletin 85, that this herd received rather poor rations during the first year, which were about as follows:

The fresh cows received a small allowance of bran and corn meal, together with timothy hay and silage, from October 1, 1901, to January 1,

1902. During the months of January and February, to the cows giving the largest flows of milk, was given approximately the following:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbohydrates.	Fat.
Corn meal	10	8.91	.790	6.670	.430
Silage	35	7.31	.315	3.955	.245
Timothy hay	10	8.68	.280	4.34	.140
Total nutrients	.....	24.90	1.385	14.965	.815

The ration which the cows received from March 1 to May 1 was perhaps somewhat better than the ration fed in January and February, but it could have been much improved with mill feed. The rations to the fresh cows were about as follows:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbohydrates.	Fat.
Rye	4	3.54	.396	2.704	.044
Crushed corn and cob meal	4	3.40	.176	2.400	.116
Silage	35	7.31	.315	3.955	.245
Timothy hay	7	6.08	.196	3.038	.098
Total nutrients	.....	20.33	1.083	12.097	.503

May 1, ground oats were substituted in the place of rye. The cows were turned out to pasture about May 25, but were given a small allowance of silage to July 1. From this time on to the completion of the year's work they received nothing but grass.

It is plain to the skillful feeder that the rations the herd received were very poor. The generally unsatisfactory condition of the herd bears out this fact. The herd was fed somewhat better during the second year.

From October 1, to November 15, 1902, the herd received a little shock corn with grass. Beginning November 15 and continuing to February 1, 1903, the best cows received about the following:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbohydrates.	Fat.
Shorts	9	7.94	1.098	4.500	.342
Silage	25	7.31	.315	3.955	.245
Corn stover	15	8.91	.255	4.860	.105
Total nutrients	.....	24.16	1.668	13.315	.692

During the months of February, March and April the best milkers received the following:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbo-hydrates.	Fat.
Shorts	6.5	5.73	.793	3.25	.247
Peoria gluten	2.5	2.25	.582	1.26	.067
Silage	40	8.36	.360	4.52	.280
Total nutrients	.....	16.34	1.735	9.030	.594

In connection with the above ration either corn stover or timothy hay was given in quantities large enough to satisfy the animal's appetite.

May 1, the herd was turned out to pasture and during this month received all the silage they would eat. From June 1 to the completion of the test the herd received nothing but grass.

Average Yearly Record of Herd "A" for Two Years, and Average Production for that Period.

Year's work.	No. of cows.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.
First	18	3,970	3.55	141	164
Second	14	5,255	3.82	201	234
Average for two years	....	4,613	3.71	171	199

The herd in the second year gave 1,285 pounds more milk and 60 pounds more butter fat, per cow, than it did in the first year. This increase in milk and butter fat was largely due to a better system of feeding during the second year. There were, however, a few new cows in the second year, and a few of the poor cows were sold at the end of the first year. This change, of course, had something to do with the increased yield of the herd. There were still a few cows kept upon this farm that were so poor that the owner would not enter them in the test.

Record for Cow No. 6 for Two Years, and Her Average Production for that Period.

Year's work.	Age, yrs.	Breed.	Date of calving.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
First	3.5	Native.	May 29, 1902	1,838	4.43	81	95	210
Second	4.5	Native.	May 4, 1903	3,624	3.84	139	162	238
Average for two years	....	....	....	2,731	4.02	110	128	224

Cow No. 6, the poorest animal in herd "A," in two years gave 5,462 pounds of milk and 220 pounds of butter fat. A good dairy cow should produce as much in one year as three animals of this kind.

Record of Cow No. 10 for Two Years, and Her Average Production for that Period.

Year's work.	Age, yrs.	Breed.	Date of calving.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
First	4	Native.	March 5, 1902	3,833	3.37	129	150	245
Second	5	Native.	March 1, 1903	3,553	3.55	126	147	298
Average for two years				3,693	3.46	128	149	272

The average of cow No. 10 is very low. Why she produced more milk and butter fat in the first year's test than in the second, when a better ration was fed, cannot be intelligently answered.

Record for Cow No. 15 for Two Years, and Her Average Production for that Period.

Year's work.	Age, yrs.	Breed.	Date of calving.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
First	9	Gr. Polled S. H.	Nov. 4, 1901	6,145	3.63	223	260	294
Second	10	Gr. Polled S. H.	Nov. 15, 1902	6,874	3.87	266	310	273
Average for two years				6,510	3.76	245	285	283

Cow No. 15, which was the best animal in herd "A," gave considerably more milk and butter fat in the second year's test than she did in the first. Her increased yield seemed to be entirely due to a better system of feeding.

REPORT OF HERD "F."

There were seventeen Holstein cows in the second year's test; their average weight was about 1,100 pounds. The herd was kept in a comfortable barn, was in healthy condition during the two years and did a much better year's work during the second test.

The cows were given but little grain during the first year. For a period of seven weeks in the winter, they received no grain, but were fed corn silage, clover and corn stover. During the second year the herd received a liberal allowance of grain.

The kinds of concentrates and roughage fed during the two years were as follows:

First year:
- Bran.
- Oats.
- Grano gluten.
- Clover hay.
- Corn stover.
- Corn silage.

Second year:
- Bran.
- Oats.
- Dried malt.
- Dried brewers' grain.
- Clover hay.
- Corn stover.
- Corn silage.
- Timothy hay.

The herd was fed during the first year, as follows:

From October 15th, to December 1, 1901, the best cows received about the following:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbo-hydrates.	Fat.
Bran	4	3.54	.516	1.604	.168
Oats	4	3.56	.368	1.892	.085
Clover hay	5	4.25	.340	1.790	.085
Stover	10	5.95	.170	3.240	.070
Silage	35	7.31	.315	3.955	.245
Total nutrients	....	24.59	1.709	12.481	.704

From December 1, 1902, to February 1, 1902, the ration consisted of thirty-five pounds of silage, five pounds of clover hay, and all the corn stover they would eat.

The best cows received about the following ration from the first of February until they were turned out to grass:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbo-hydrates.	Fat.
Orange gluten	2	1.88	.534	.776	.248
Silage	35	7.31	.315	3.955	.245
Clover hay	5	4.23	.340	1.790	.085
Corn Stover	10	5.95	.170	3.240	.070
Total nutrients Oat straw ad libitum.	....	19.37	1.359	9.761	.648

The cows were turned out to pasture about June 19. The owner did not have enough pasturage to feed his herd entirely, so the ration

was supplemented with thirty pounds of corn silage a day. This ration was continued to the completion of the test.

The best cows were fed on an average during the second year approximately as follows:

From October 25, 1902, to February 10, 1903, the best milkers received about the following:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbo-hydrates.	Fat.
Bran	4	3.54	.516	1.604	.136
Oats	4	3.56	.368	1.892	.163
Clover hay	2	1.68	.136	.716	.034
Timothy hay	3	2.26	.084	1.302	.042
Silage	40	8.36	.360	4.520	.280
Corn stover	15	8.92	.255	4.860	.105
Total nutrients	.....	26.80	1.709	14.886	.765

From February 10, until the cows were turned out to pasture, they received about the following:

RATION.

Food stuffs.	Lbs.	Dry matter.	Protein.	Carbo-hydrates.	Fat.
Bran	2	1.77	.258	.802	.068
Oats	2	1.78	.184	.946	.084
Dried malt	2	1.84	.314	.716	.102
Silage	60	12.54	.540	6.780	.400
Clover hay	2	1.68	.136	.720	.034
Timothy hay	3	2.26	.084	1.302	.042
Total nutrients	.....	21.87	1.516	11.266	.730

The cows were turned out to pasture May 20, and were allowed to graze about two hours each day. In connection with pasture grass, the herd received two pounds of bran, two pounds of dried brewers' grain, and 25 pounds of silage a day. In July and August most of the cows went dry and were fed 25 pounds of silage and pasture grass. The majority of the cows calved in September and October, thus beginning their third year's work.

Average Yearly Record of Herd "F" for Two Years and Average Production for that Period.

Year's work.	No. of cows.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.
First	11	5,846	3.32	194	227
Second	17	7,171	3.29	236	275
Average for two years	....	6,509	3.30	215	337

The herd in the second year gave 1,325 pounds more milk and 42 pounds more butter fat per cow than it did in the first. This can be accounted for in three ways:

(1) The cows received during the second year's test a better ration.

(2) Many of the poor producing animals were disposed of at the end of the first year's test.

(3) A few new cows were purchased that proved to be good producing animals.

Yearly Record of Joe's Bride for Two Years and Average Production for that Period.

Year's work.	Age, yr.	Breed.	Date of calving.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
First	9	Holstein.	April 4, 1902.	5,136	3.00	145	180	275
Second	10	"	Sept. 10, 1903.	3,984	2.91	116	135	274
Average for two years	.....	....	....	4,560	2.96	135	158	274

Joe's Bride, the poorest cow in this herd, produced in two years 9,120 pounds of milk and 270 pounds of butter fat. There is no reason why a good dairy cow with no adverse periods, should not produce in one year, as much as this cow did in two years.

Yearly Record of Check for Two Years and Average Production for that Period.

Year's work.	Age, yr.	Breed.	Date of calving.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
First	15	....	Jan. 25, 1902.	6,812	3.16	215	251	252
Second	16	....	Mch. 27, 1903.	5,475	3.36	184	215	259
Average for two years	.....	....	....	6,144	3.25	200	233	256

Check's record is not high, but it is fairly good when her age is considered. In her fifteenth year she made 12.2 pounds of butter fat in seven consecutive days. This record permitted her to enter the Holstein Friesian Advance Registry.

Yearly Record of Alfrida for Two Years and Average Production for that Period.

Year's work.	Age, yr.	Breed.	Date of calving.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
First...................	7	Holstein.	Oct. 14, 1901.	7,641	3.22	246	287	336
Second.........	8	"	Nov. 8, 1902.	11,445	3.40	389	454	365
Average for two years	... ..	....	....	9,543	3.33	318	371	350

Alfrida, the best cow in herd "F," did considerably better in her second year than she did during the first. At the beginning of her second year she was officially tested but failed to qualify, making only 11.9 pounds of butter fat in seven consecutive days. Notwithstanding this she gave 11,445 pounds of milk and 389 pounds of butter fat, which made 454 pounds of butter. While Check the year before was officially tested and qualified, making 12.2 pounds of butter fat in seven consecutive days, yet, she gave, during that year, only 6,812 pounds of milk and made only 215 pounds of butter fat, and 251 pounds of butter. In other words, Alfrida failed to enter the Holstein Friesian Advanced Registry, but produced 4,633 pounds more milk and 174 pounds more butter fat in one year than Check, that entered the Holstein Friesian Advanced Registry. Moreover, Alfrida's average record for the two years is greater by 3,399 pounds of milk and 18 pounds of butter fat. The point is: does one week's record in a whole year, give the true value of a dairy cow?

It is plain to every thoughtful man that we must be guided by yearly records and place but little, if any, confidence in the weekly test. But we must not stop with one year's record and base our selections upon one's year work.

While the scales and Babcock test can be of great service in the selection of our dairy animals, they must, however, be used with judgment. Dairy cows have their "off years," and this must be considered when the herd is being culled. If we do not bear this fact in mind, we are apt to sell some of the best cows from our herds. The writer has in mind the cow Sweet Briar, of the Minnesota Experiment Station, that produced for ten years an average of 358.07 pounds of butter a year, while in 1898 she produced only 206.62 pounds of butter, but in 1899 she made 306.53 pounds and in 1901 370.53 pounds. If the merits of Sweet Briar had been wholly based on the work she did in 1898, she would have been classed as a very ordinary cow, and perhaps sold. The great value of scales and Babcock test lies in their continued use in the dairy herd and not in one year's test. Good heifers usually come from the best dairy cows, but it sometimes happens that a promising

heifer may do very poorly for the first year. In such cases, the heifer's individuality together with her breeding should be considered before she is sold. The testing of cows should, however, be carried on in every dairy if a systematic selection is to be made. A good cow seldom has two "off years" in succession.

In closing let me present a few tables comparing the result of different cows and herds, and also comparing the first and second year's work.

Table 1.—Comparing the average performance of the best and the poorest herds; also giving the average performance of all the herds tested:

	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.	Days in milk.
Best herd	6,444	4.17	269	313	330
Poorest herd	4,613	3.71	171	199	271
Average of herd	5,261	4.06	214	249	300

Table 2.—Giving average record of the cow producing the most butter fat of all the cows tested, for two years and average record of the cow producing the least butter fat:

Name of cow.	Herd.	Milk, lbs.	Fat, %	Fat. lbs.	Butter, lbs.	Days in milk.
Pet, best cow	"N"	7,190	5.10	367	428	315
Joe's Bride	"F"	4,566	2.96	135	158	274

Pet of herd "N" gave for the two years an average of 2,630 pounds more milk, 232 pounds more butter fat, and 270 pounds more butter, per year than Joe's Birde of herd "F."

Pet of herd "N" has the highest average record of all the cows tested and Joe's Birde of herd "F," the lowest.

Table 3.—Giving the total amount of milk and butter fat produced by the ten herds in the first and the second year, also the total number of cows:

Year's work.	Cows, No.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.
First	160	791,088	4.057	32,099	37,449
Second	145	813,586	4.081	33,200	38,733

There were 15 more cows in the first than in the second year, but the 145 animals produced 22,498 pounds more milk and 1,101 pounds more butter fat, in the second year than in the 160 cows gave in the first.

Table 4.—Giving the average yearly production for all the herds that have been tested for two years:

Year's work.	Milk, lbs.	Fat, %	Fat, lbs.	Butter, lbs.
First	4,944	4.06	201	235
Second	5,611	4.07	229	267

The percentage of increase in the second year per cow, of the ten herds tested, was 13.7 per cent of milk and 13.9 per cent of butter fat. In other words, the average increase per cow was: 667 pounds of milk, 28 pounds of butter fat, and 32 pounds of butter.

(By courtesy of Hoard's Dairyman.)

Missouri's world famous Holstein cow, Shadybrook Gerben. Her official record at the St. Louis World's Fair was 8,101.7 pounds of milk making 330.38 pounds of butter in 120 days. She has never been defeated. Owned and exhibited by M. E. Moore, Cameron, Mo.

MY EXPERIENCE WITH COWS.

(Prof. T. L. Haecker, Chief Dairy Department, Agricultural College, St. Anthony Park, Minnesota.)

Ladies and Gentelmen—I do not know that I ever before confronted an audience when I did not know what I was going to say when I got on the platform, as is the case at this moment. I am hardly myself to-day, being awake all night and having been awake the previous night before I started, and I am in a quandry how to proceed with this talk so as to make it the most effective.

I will have but little time to give to you and I am very anxious that I should accomplish the most good for the time that I occupy. I will, therefore, give it rather a practical trend and pass over a few points very rapidly.

I came into this educational work from the farm, from the practical end of it; I had never had any education from the scientific standpoint of farming or dairying; I had never expected to leave the farm. Farm life, and especially dairying, was very agreeable to me and I had expected to spend my life time on the old farm, but peculiar circumstances called me elsewhere. There was a dairy school started in Madison, Wisconsin and I made up my mind to attend it. Mr. Gurler here was the instructor. I had been very successful in dairying, probably getting a larger yield from my cows than any other person in that State, and yet I felt that there were some things to learn, and if there was anything to learn, I was willing to spend the winter in doing it; so I attended the first dairy school. Before I got through with that course I was asked to come to Minnesota to take charge of the dairy work in that State. During the summer I made the change.

As a result, I did not return to the farm, but came to Minnesota and took charge of the dairy work of the College of Agriculture. I have aimed all the time I have been connected with that work to carry it along lines which would bring about results valuable to the farmer. The question arose at once, what could I do here to help the farmer the most.

So I carried on an experiment with cows. I bought a herd of cows and took reasonably good care of them. I kept account of each cow, weight of the daily feed, the daily yield of milk, the butter fat, etc., getting all the information that I could as to the profits that there were in dairying, carrying it on from a business standpoint.

The accommodations I had were such as any farmer could provide. While the cows that I had were probably better than the average farmer could get, yet there were in that herd cows that were no better than those we find throughout the northwest.

After completing the year's record—and I thought that that one year's record would answer the question as to the cost of production and what the profits would be at ruling prices—I published a bulletin and made the announcement. In a general way the results were satisfactory. There was, taking the whole herd, a good profit in the dairy, charging the cows with the feed they consumed and crediting them with the milk and butter fat that they yielded.

DAIRY FORM.

But in looking over the profits, I found some cows made a great deal more than others, some twice as much as others. Indeed my records showed the same results that were exhibited to you here this morning by Prof. Washburn. We continued the work for three or four years and we found with our sixth year the same story was told, that some cows produced reasonably large yields at little cost, while others made small yields at relatively large costs, and when we came to sift the truth down in regard to the cow that made the best return and gave us the large profits, we found that it was a certain style of cow. Just as you know that a certain style of horse will make a good trotter; just as you know that a certain type of horse will draw a heavy load, or a certain kind of dog will do a certain kind of service, so a certain type of cow will produce milk and butter. In every day's work, in every week's, month's or year's result we found the same story.

Now it seemed to me if I could present this to the people of Minnesota or the dairymen of the West, and show them the kind of cow that gave such large returns at uniformly such a small cost, that every man who was at all interested in the dairy would in a very short time get that kind of cows; so I distributed my bulletin throughout the state of Minnesota, telling them the results that I found, and what was the outcome of it? Today in Minnesota there are fewer dairy-bred cows than there were ten years ago when I came to the state. Today there are fewer dairy-bred herds in that state than there were ten years ago. Now why is this? There is no question about the truth of this work. There is no question but that the dairy cow will earn more than double the amount per year than the common cow will, and yet the average farmer uses the common cow.

COMMON OR DAIRY COW, WHICH?

Now after seeing this disposition on the part of the farmer to use the common cow, I wondered why this was. The question arose, is the dairy cow, after all, best adapted for his work, for the conditions which he has at home on the farm? When I looked over the history of dairy-bred herds that I have known, especially during the last twenty-five years, I found a large majority of them were failures. The farmer had read these accounts and was satisfied that the dairy cow necessitated so much more work that if he attempted to use her, he would not succeed. Now why was that so? Take for instance the southern part of the state of Minnesota—a state that has made wonderful progress in dairying. When the creamery work began there in 1890 the farms were nearly all heavily mortgaged on account of the failure of the wheat crop and in less than ten years that country was well to do from one end to the other.

Now that means that, while there is this large discrepancy between the common cow and the dairy-bred cow, yet we must inquire, when we recommend the dairy-bred cow, whether the conditions of the average farmer are such that that cow will do better for the farmer than the thoroughbred dairy cow.

Illustrating this matter a little further, taking the records of our herd from year to year we found that the herd as a whole would yield about 350 pounds of butter per year. Taking that herd and dividing it into two, putting the common cows on one side and the dairy cows on the other, the dairy cow, as a rule, gives 460 pounds of butter a year and the common cow gives us about 290 pounds. Now it is generally claimed by authorities that a cow will not pay for herself until she reaches about a yield of two hundred pounds. There is a discrepancy between this statement and the results that the farmers have obtained in southern Minnesota. I have told you what progress they have made with the common cow, and that that common cow falls short of 200 pounds of butter a year.

During the time of the Paris Exposition, the general government undertook to take the census of our best county, Freeborn county, Minnesota and canvass the farmers and ascertain the number of cows that they were milking, the amount of milk that was going to the creameries, the amount received for the milk and the yield per cow. Then a map was made locating the different creameries in the county and these statistics showed that the average yield per cow in Freeborn county

was from 150 to 200 pounds of butter per cow. Some localities averaged two hundred pounds, some about one hundred and fifty. Now we found that wherever farmers had given any attention to the feeding problem and to the handling and management of the cows, that there was a difference generally of about fifty pounds per cow in yield. Where the farmers had no local meetings and were paying little or no attention to the method of handling and feeding cows in some localities, the average for the creamery ran down to 135 pounds per cow. Now that shows that so far as the average dairyman is concerned, the first lesson for us to teach him, is how to handle the cows that he has, rather than to try to persuade him to get the kind that he has not, because when we attempt to do the latter we certainly shall fail. There will not be one farmer in five hundred who will change the kind of cow he is now using during his life time, and there will not be one dairyman in a hundred who will use a dairy-bred cow. There is not one dairyman in a hundred who is fit to handle a pure-bred cow. Now there is where we come to this difficulty. What is the use in urging upon farmers to buy or get a kind or breed of cows who are not at all in sympathy with those cows, and who have not the disposition to give those cows the kind of treatment that they need? Before you attempt to keep thoroughbred cows, you should study your problem and train yourself to take care of the common cow that you have, and get from her all that she is capable of producing. If you do not succeed with the common cow—that is, if you do not succeed in getting from her, her possibility, why should you succeed with the cow that is far more difficult to manage and requires better accommodations and better care than does the common cow?

Now this is the first step in successful dairying. You have got these cows, now the question for you to determine is, what steps must you take to get the most out of the ordinary cow? We have now to work that out. We find this peculiar discrepancy: while the common cow on the average farm in Minnesota gives about 150 pounds of butter, and I am told in Missouri about 130 pounds of butter per year, the common cow at the Minnesota Experiment Station yields 290 pounds. I have about forty complete yearly records of just ordinary cows, which came to me by mere chance, all except three or four of them being selected by parties other than myself. Now if the common cow will do for me, you might say, with proper care and management, nearly doubly as much as she will do on the farm, what process is it necessary for the farmer to follow to get similar results? I used to think these

results were brought about by feeding a certain kind of a ration, and I taught that for several years, thinking that I had practically solved the problem, when the common cow gave me about 275 pounds of butter per year, to put it in round numbers, while she was giving the farmer only 150 pounds; but since that I have found that there are other reasons, and probably that balancing the ration is only a small portion of the problem.

KINDNESS AN IMPORTANT FACTOR.

In using the cow for commercial purposes, we are using a mother that is giving milk because of her young, and this process of giving milk is not a voluntary action, consequently any little disturbance, any little lack of management will cause a diminution of the flow of milk, the manufacturing process will decrease; and the more careful the farmer is in handling the cow, the more regularly she is handled, the more comfortable she is kept, the more even will be this flow of milk. Now here is the great trouble with the average farmer, he does not provide the cow with comfortable quarters, he does not give her that combination of kindness and care that she needs as a mother, and consequently there is a strangeness so that she does not know whether her owner is her friend or foe and consequently, when she comes in there is little attention paid to her or the calf; she is probably allowed to be in uncomfortable quarters, the calf is allowed to be with her for a few days, three or four, or five—possibly two weeks, and during that time there is only enough milk removed from her udder to satisfy the wants of the calf, if there is any surplus it is left in the udder and there is a back process. Then comes the process of removing the calf. The cow is terribly agitated, worried and fretted, and every bit of worry, every bit of discontent, every uncomfortable feeling has an influence in decreasing the flow of milk, so that after the average cow goes through with the process of having her calf removed, when the farmer begins to milk her she is already giving about half her flow of milk. Here is where the difficulty is, the farmer does not know the importance of being on good terms with his cow. He should know every one of his cows and every one of them should look upon him as her greatest friend, should know he is not going to hurt her, as he never does, should follow him and look up to him for support. A cow with that feeling toward her master is in a position to give double the milk that she would give if she had not that feeling toward him. The average farmer does not think anything about whether he likes his cow or whether the cow likes him, and yet that is the secret of getting a large flow of milk.

CARE OF COW AT CALVING TIME.

Another thing, when the cow is about to come in, she should be placed in a box stall and if there is any time when you are going to devote extra time to that cow to get her good will, that is the time to do it. A little attention then will accomplish wonders. Be with her frequently. Be with her when the calf is dropped and soon afterward, when the calf has nursed once and she has licked it off and the little thing has been standing on its feet, remove it so as to have as little disturbance as possible. If you can have it removed when she is away from the stall, so that she will not connect you with the loss of her child, so much the better, and that means a great deal. When the calf has gone, then is the time to groom and caress her. Form that time on, that cow should be fed as regularly as can be, milked regularly, the feed should be regular in quantity and everything should be done to make her comfortable and contented, and in that way you can about double the flow of the milk of the cow the first year. Now it is not expected that you can follow this advice and be successful with every cow, but I believe that fifty per cent of the dairymen before me, if they will follow these simple rules that I have laid down will add the first year fifty per cent to the yield of milk.

Now a few words in regard to the feed or in regard to the management. In the first place every cow should have her stall. What is the difference whether old Brindle is in the first stall or in the second? It is this, you want to have every cow in her place, so that when she is let out, probably to go to the tank to get water and then let in again to the barn, she will walk to her place. Everything should be systematic, should go quietly on and in order. The least disturbance, one cow going to the wrong stall or two cows going to the same stall at once, makes trouble, and each disturbance will cause a shrinkage in the milk and the cows will soon be giving only half their former yield.

It is unnecessary to have any extra fine equipment of stables. I have a barn such as any farmer can afford. I use the common Bidwell stall, having guttering behind and partitions running back to the gutter, plain board boxes for each cow and the other conveniences in the barn are such as any farmer can have, so the results that I get there can be secured by any farmer if he manages his herd in that way.

MISSOURI'S GREAT ADVANTAGES.

In regard to feed the State of Missouri is in a position where she can produce milk very economically. She has the corn, she has the rich soil where she can raise quantities of hay or fodder corn. She is near to the South where they have cotton seed meal or she can have the gluten meal from the glucose sugar refining companies with which to balance the ration. I know of no state in the Union that is able to produce milk any cheaper than the State of Missouri. With us in Minnesota feed stuffs are a little more expensive, but here corn is cheaper and you are raising large crops of it, and your ration can be balanced, as I said before, with gluten feed or cotton seed meal, while we have to use oil meal, which is a little more expensive.

COST OF FEED.

Now the first three weeks in January I made calculations in regard to the cost of the feed consumed by each cow in the herd and the average daily board bill was 12½ cents per cow, charging the cows 40 cents a bushel for corn, 38 cents a bushel for barley, 26 cents a bushel for oats, $22 a ton for oil meal, $2 a ton for silage and $7 a ton for hay. The average daily yield of butter fat was 1.2 pounds; the butter fat weight was 20 cents a pound, which makes the butter fat alone worth 24 cents per day per cow, with a daily cost of feeding of 12½ cents. Now this covers a herd of about 35 cows and is the average result for the first three weeks in January. The reason I selected the first three weeks in January is because that was the middle of winter. Silage feeding with us in Minnesota commences the first week in October and it ends the first week in May, so I calculated that if I ascertained the cost of the daily ration during these three weeks and the yield that I got during that time, that it would be the average for the winter, and that means that for 12½ cents' worth of feed per day, my cows will return me 24 cents' worth of butter fat.

DISCUSSION—COW TIES.

Mr. ——What do you tie your cows with?

Mr. Haecker—I do not tie them. I put a rope behind them, running from one partition to the other. It is fastened with a knot, staple and hook, then another staple and hook and when the cow goes out the rope is unhooked, turned and she passes out lengthwise.

COTTON SEED MEAL.

Mr. ———Is cotton seed meal a good feed?

Mr. Haecker—It is very satisfactory. I would not want to use a large proportion of it in the ration, but there is no objection to one or two pounds, or even three pounds. I would not use any more than four pounds of corn meal per day per cow. I find if you go above that you are apt to have inflammation of the udder, but if you restrict it to about four pounds per thousand pound weight per cow, you will have no difficulty with it. With us in Minnesota we use considerable barley, it is not quite so heating as corn. We give each cow 4 pounds corn, 2 pounds barley, 3 pounds oats and one pound of oil meal. That makes a very satisfactory ration for a common cow. I would just as leave use cotton seed meal, or nearly so, as oil meal, it would provide a little more protein. This ration will not do for high type dairy cows, as we found in our third winter's experiment with that ration; for the cows that give more than 300 pounds of butter a year this ration will not be satisfactory, but for cows that give 250 pounds a year, this is ample. For good dairy cows that give 300 pounds of butter, I would take off one pound of corn meal and add an additional pound of oil meal.

Mr. ———How many pounds of that mixture do you feed?

Mr. Haecker—The herd this winter averages eight pounds, it ranges from 5 to 12 according to the yield of milk. The highest feed that any cow gets is 12 pounds per day, a Holstein weighing about 1,300 pounds. A young cow weighing about 700 pounds gets 5 pounds, and then we feed meal according to the yield and five times as much silage as meal if the cow will take it, generally about four times as much silage as meal is all they will take, and about half as much hay as meal. This makes a very economical ration, and I think you will find it so here. You have no difficulty in growing the silage. There is only a small portion of hay fed, the larger portion of the ration is corn. Shorts may be substituted for barley, and bran may be substituted for oats.

Mr. ———How is corn and cob meal?

Mr. Haecker—I have not used corn and cob meal with the dairy herd, so I cannot give you answer from actual results, but it is reckoned to be equal to corn meal for feeding purposes; whether it is for the dairy cow, I cannot say.

COWS FRESH IN FALL.

Mr. Mallory—Have you any record of the periods of lactation for those cows you fed the first three weeks in January?

Mr. Haecker—As a rule the cows came fresh in the fall. One of

them had been in milk a year. Another was in her fourth continuous year of lactation the latter part of March, so she had been in milk three years and six months when the silo feeding began last fall. The others were fresh cows.

Now it is advisable to have the cows come in in the fall because that is the time that you can take the best care of them. That is the time that you can keep the flow of milk better than you can at any other time of the year, and that is the time of year that milk brings the highest price.

Now there are three reasons why you should have the cows come in in the fall. Why not in the spring? Aside from the fact that you are very busy and that your cows are not in their flush when dairy products are at the very lowest price, you cannot keep up as much flow during the summer from cows that come in in the spring as you can with cows that are fresh in the fall, on account of the flies. No matter how good care you take of your cows, the worry of fighting the flies by the first of August or the middle of July, you will find is so great that they get down to mere strippers. Another thing, you are very busy at that time of year, and why the average farmer will persist in having the cows come in in the spring and not in the winter when the cows are eating his good feed and making no return, I cannot understand! The yield of dairy products of cows that come in in the fall is always increased when they are turned on to pasture in the spring.

By this careful treatment of cows mentioned and this method of handling and feeding mentioned, an even flow of milk can be kept up nearly all winter long, and then in the spring when the cows go out to pasture they get the succulent grass, they will flush up a little and we can maintain a good flow with us in Minnesota until about the middle or fifteenth of July. I presume that Missourians can do so up only until about the first of July, the time that the flies begin to come, there is then a shrinkage in the flow of milk.

FEEDING ON PASTURE.

Mr. ———Do you feed grain in the summer on pasture?

Mr. Haecker—Yes. I have about fifty head of dairy cattle and fifteen acres of pasture. I have five acres for soiling crops and twenty acres for silage, and the rest of the feed I buy. I have fifteen acres for pasturage and five acres for soiling crops, any little thing I want to have early in the season before my silage is ready, and twenty acres for silage. I have two silos. Each one holds the product of ten acres of fodder corn.

Mr. ———Do you feed silage in the summer?

Mr. Haecker—Yes, sir.

We have twenty acres of corn and 35 milk cows, on an average, and 25 yearlings and two-year olds and the 40 acres takes care of the whole herd.

Mr. ———For the year around?

Mr. Haceker—Yes. Of course I have to buy meal and my hay, but the cows are returning me double what this feed costs. I do not care what I have to pay for my feed, every pound of feed I give to my cows will pay me just about twice in butter fat everything that that feeds costs. The average yearly board bill amounts to $30 per cow.

THE SILO.

Mr. ———What are the dimensions of your silos?

Mr. Haecker—35 feet high and fifteen feet in diameter.

Mr. ——— How are they built?

Mr. Heacker—2 by 6 studding, upright, staved silos, no grooves, no beveling, just faced on four sides. One of them has now been in use for nine years and it is just as good today as it was the day it was built.

Mr. ——— Do you have stone foundations?

Mr. Haecker—We have a stone foundation for about six or eight inches above the surface and concrete on top and studding on the cement.

Mr. ——— Does it go down into the ground?

Mr. Haecker—Yes, four feet, because it freezes deeply in Minnesota, perhaps it is not necessary for it to go so far down here.

The silo has been oiled inside every fall as we filled it. I get five gallons of linseed oil and we have a mop, and as the silage comes up, we keep oiling the staves and that is all we have done since we built it.

Mr. ——— Do you screw up the hoops?

Mr. Haecker—We have never changed a hoop since we built it. It is built of white pine. This silo is built on the inside of the barn.

This fall we built one on the outside with 2 by 4s and short slats between the 2 by 4s, ran down in grooves, to try and find out how that works. The others were entirely satisfactory, built on inside the barn, but we wanted to have an additional one outside and did not think it safe to put a stiff siding outside unless there was additional support, and we wanted another kind. We are running an experiment station and wanting all the information we can get.

A few words in regard to the silo. I am aware that very few farmers have a silo, very few farmers are going to have one within the

course of a few years. It is something that is going to grow very slowly, yet I want to say that it is the most economical way to provide feed for your cows. The way we grow silage is by sowing it rather late and planting it thickly. We use about fifty pounds of seed to the acre, planting with a drill. Generally farmers want to grow ears on their corn and they say: "I don't want to put that much seed to the acre. I would rather get some nubbins on my corn," and they sow a little thinner. I do not think that that is the better way. An analysis of our silage shows that a hundred weight of our fodder contains just as much nutriment as a hundred weight of corn put in the silo that carries ears and we get a larger crop from an acre than we do when it is planted in the hill. But I would not depend at all on this fodder corn to provide any of the grain ration. We plant it with the drill and plant it about the middle of June. I think it would have to be planted a little earlier here in Missouri.

Mr. ——— We plant the first of May here.

Mr. Haecker—The corn does not develop as quickly here as it does in Minnesota; it takes it longer to reach that stage of maturity when we have to cut it for the silo. While there are no ears developed, it has reached the same maturity with the stalk as when it carries an ear—is in the dough stage—only it has not an ear, because the stalks are standing so thick in the field that it cannot have an ear. We generally aim to prepare the silage at the usual time that it should be prepared for corn and then give it the harrow. Before the seed is planted, the weed seeds near the surface germinate and the harrow destroys them; so if you plant your corn about the middle or 20th of May you will have already destroyed a good share of the weeds that are near enough to the surface to grow that year. We do not harrow when the corn is planted and before it is up, but we harrow while it is coming up and two or three times after that, and possibly cultivate it once or twice and that is all that is necessary to do with it. Then just before frost reaches us we harvest it with an ordinary corn harvester. Either kind are made to do the work very satisfactorily with us. It is probably a little more difficult here, because with you the stalks grow taller and are a little stronger than with us, so you probably have a little more difficulty in cutting it than we have. Why do we put it in the silo? Because by putting it in the silo we practically save every bit of it, as no silage will spoil around the edges; and we begin feeding as soon as we put it in. While we do it that way, it is not necessary for you to put it in a silo. You can put it into large shocks and harvest it and feed it that way. While you feed it dry, it is necessary that you sow it as thickly as I

have said, because if you do not, the cows will eat a small portion of it, but when it is sowed thickly, they will eat practically all of it.

Mr. ——— Do you put water in the silo?

Mr. Haecker—We do if there has been a drouth, or for any cause the fodder corn when it is put into the silo is rather dry, we put in water.

Mr. Patterson—I use common field corn, eighty bushels to the acre. Do you think I lose anything by using that kind of corn for ensilage? Do you think I get as much good feed out of corn that is like feeding corn as out of fodder corn?

Mr. Haecker—How much per acre in weight?

Mr. Patterson—From 10 to 20 tons.

Mr. Haecker—Ours averages 15. It runs very near that and probably does not vary a half ton one way or the other. Your statement indicates that conditions here are different. We cannot get any such yield as that. If we get 30, 40 or 50 bushels per acre we do very well.

Mr. Glover—Through this corn country, fields sowed like those at Minnesota will lodge and it makes it impossible to cut it with the corn cutter.

Mr. Haecker—I am glad to have that statement made, because I do not want to say anything misleading, and I am at a disadvantage in living so far north, where the conditions are so different, especially with the corn plant, and very likely my method of planting might not be the best method here.

Mr. Mallory—Do you put your cow on full feed when you take her calf away?

Mr. Haecker—I put her on half feed, because it takes 4 weeks to bring her to full flow.

Mr. Miller—What kind of a cow is a dairy cow?

Mr. Haecker—A cow that is a large feeder and that does not convert her feed into meat, but into milk.

Somebody asks what kind of hay I feed. I feed prairie hay; have not used any other kind for years.

FEEDING THE CALF.

Mr. Mallory—How do you feed a calf after taking it away from its mother?

Mr. Haecker—I make it wait 24 hours for its next meal. It makes one feel bad to hear the little fellow bellow; but 24 hours after that I go to the calf with about 3 pounds of milk in a bowl, and it does not ask for any finger or teat or anything of the kind.

Mr. Mallory—Do you give it fresh milk?

Mr. Haecker—Yes, fresh milk from its dam for one week, ranging from 3 to 4 pounds at a feed. I feed twice a day. If it is a medium sized calf, it gets 3 pounds, a large one gets as much as 4 pounds. It would be better to feed during noon for a week or two, but as a rule we are pretty busy and make the calf wait till evening. One objection to feeding three messes of milk is that when you feed him at noon you will have to save the morning's milk and you do not know what gets into it in the mean time. After the first week, give half whole milk and half skim milk. After the second week we give the separator skim milk in increasing quantity, because the skim milk is just as heavy feed as the whole milk and here is where a great many farmers make a mistake. They think this is skim milk, and I must give the calf a lot of milk to make up for it. The chances are the next morning the calf has scours or colic and half of the calves that die are killed in this way, by overfeeding. After the third week I give it possibly a pound more of milk and add one teaspoonful of ground flax. If you have no ground flax, I would use at first oil meal for a week or two and then I would gradually change over to corn meal, using only a little in the milk. Then I would increase the skim milk and the flax meal at such a rate that by the time the calf is 4 months old he is getting 10 pounds of separator skim milk per meal and a tablespoonful of the meal.

Mr. ——— How would cottonseed meal do?

Mr. Haecker—It is objectionable because it contains the same nutrients that skim milk does, has a very high per cent of protein and so has milk. For that reason we either take flax, which is one-third fat and change over as soon as possible to corn meal, which has a high per cent of carbohydrates to balance up the ration. We have been raising calves for fifteen years in this way where we have weighed every mess. Every calf was weighed each week and the growth that we got and development of the calf is just as satisfactory as is the case when we feed whole milk.

DAIRY BRED STEERS.

A matter in which you are all interested is this. During the last 5 years I have also reserved some dairy steers, and have brought them up just in this way, giving them skim milk as we do the heifers that are growing and as they got larger giving them a little more meal, feeding them regularly the ordinary mixture of meal, prairie hay and silage; so that when they are two years old the most fattened ones are getting about 7 pounds of meal, that is the ones weighing about 1,200 pounds, while the smaller ones like the Jerseys, are getting about 5 pounds. We have

butchered these steers at our institution, taking the percentages of the different parts. We have sent now for the last few years one or two of these steers to the fat stock show with our beef cattle. They have their value on the block and from the reports that we see in the papers, in the Breeder's Gazette, where official reports are made, the dairy steers are giving just as good an account of themselves as are the others.

You probably noticed that there were some cross-bred dairy steers from Minnesota, a Hereford-Holstein and an Angus-Holstein. The Hereford-Holstein steer was one of the best steers, I believe that we have at our Minnesota Experiment Station in so far as the cost of production is concerned, and one of the best steers so far as putting the larger portion of meat on the choice part of the body is concerned, was the Jersey steer. We have found by this experimental demonstration that there is a great question whether there is anything in the things we have been taught in regard to the form that is necessary to make a profitable beef steer. I called the attention of Prof. Shaw to a bunch of dairy steers that we had last spring, two of which went to the fat stock show, and he says: "Prof. Haecker, you amaze me." I said: "Look at those steers, examine them, see whether they are lacking in putting meat on the most valuable parts;" and he could not help but see that they were full in the loin, full where the choice cuts were and weak on poor cuts like the round —they carry a poor round—but so far as cost of production is concerned, we have found no material difference between the beef and dairy steers, that is the steer of a dairy cow, bred to a beef sire. This is a sensible thing to do. Suppose you want to milk half a dozen cows. Have those cows thoroughbred dairy cows, take the very best care of them, and if you do not want to raise any more of that kind, breed those cows to beef sires and save both heifers and steers for beef and, my word for it, they will make as cheap beef as any you will get and at the same time you will have cows that will make you a large return in the dairy.

MAINTAINING THE HERD.

Mr. ——— How would you maintain a dairy herd?

Mr. Haecker—Always breed when you want to increase or add to that dairy herd, those dairy cows to the best dairy sires you can get hold of. Take advantge of heredity. When you have enough young cows, breed again to the beef sire.

Mr. Miller—I have in mind a young friend who has a lot of Herefords. He wanted to go into the dairy business for the profit that there is in it. He asked me and I told him my opinion about it. But for the good of so many of these people that are here I wish you could explain to them

how to start with what cows they have now, mainly Herefords and how to get on without too much expense.

Mr. Haecker—It is a very difficult problem and I am very sorry to hear that there is a large sprinkling of Hereford blood in your cows. I am a dairyman and I believe in telling the truth; wherever you have Hereford blood, goodby milk, quantity, quality; and I do not believe that you are going to get an additional benefit out of the steer when he is sold. My dear friends, what are you getting out of a steer anyhow? Nothing. You charge your cattle with what they have consumed from the time that they were born until they go to the stock yards and they are in your debt. We can show that for every dollar's worth of feed you put into a good dairy cow she will give you two dollars' worth of dairy products. Why fool around with this business?

NECESSARY CONDITIONS FOR SUCCESSFUL DAIRYING.

(Hon. H. B. Gurler, DeKalb, Ill.)

Such an audience as this certainly ought to inspire a man to do his best. I have not been in Missouri but once since 1861. I had some unpleasant experiences in your State at that time but I never have laid it up against Missouri at all.

Now your President gave me a subject—"The Necessary Conditions for Successful Dairying"—I think that was it. I think of first importance is the person back of the work, the man or woman who is conducting the business. Successful dairying, like success in any other line of work, means that the person shall study that business, get down to the details of the work, know what is the cost of production, when you are getting profit and if you are getting that profit, go to work and find out where it comes from. There is no business, mercantile, manufacturing, farming or anything you wish to mention, that is prosperous unless the person who runs the business masters the details and knows what he is about. It is as necessary in dairying or whatever you do on the farm as anything else. I am staggered many times to see the lack of business management in our work.

I will tell you a little incident that happened some three years ago. A gentleman came to me who had a son that had been educated for the bar. The young man was 25 years old, had graduated and commenced the practice of law, but did not like it and stole away and took a course in agriculture at some agricultural college. The father made up his

mind that the son would never make a lawyer and had been looking around on Brier Cliff Farm on the Husdon and studying the proposition of fitting up a farm for his son. The last remark the father made to me was: "There are greater opportunities on the farm than in any of the professions"—and that from a professional man. I will never forget it so long as I live. I fully believe that to be true.

I have been through this, have worked on the farm sixteen hours a day until I could work no longer. I used to be told repeatedly that I was making a mistake in working too hard, that I could afford to hire somebody to do the work I was doing, but I had been educated that way and could not get out of the ruts. It is hard to get out of the ruts you are raised in.

But to go back to your question, next to the man or woman—there are women successfully managing dairies; we have some in Illinois that we are proud of, and I don't know why there should be any great difference between the women on this side and the other side of the Mississippi —perhaps the next important point is the cow. This subject, the cow, has been treated so nicely, so intelligently by Prof. Haecker and will be later by Mr. Glover, that I am not going to say much about it. There are other men who can handle that point better than I can.

ALFALFA.

Now I learn that your State grows corn successfully, grass and clover and I don't know what more you need.

(Mr. Patterson—We need alfalfa.)

I don't like to talk much about that. I do it at the institutes, but mainly in telling of my failures and we get information from the audience. But my failure was in having it frozen. I am feeding alfalfa meal shipped from Ohio, Western Kansas and Colorado, alfalfa ground in the mill.

I will tell you while I am on it—this talk is going to be hash—a little of this and a little of that—I find that we have been doing a little experimental work in a business-like way; we have not gone down to the bottom of it, as they would in an experiment station. We fed first with alfalfa meal mixed with corn meal and gluten feed, then alternated with wheat bran mixed with corn meal and gluten feed, then back to the alfalfa meal mixture, and we have just gotten to where it is hard for us to tell which brings the best results, a ton of alfalfa meal or a ton of wheat bran. If I were called upon to decide today, I would say I don't know which would bring me the best results. But we found out this, when we feed alfalfa meal we do not have to feed oil meal as a conditioner.

The alfalfa meal has a better effect on the cow's system than the wheat bran, the droppings look like those out on pasture. I am very much pleased with the alfalfa meal. It cost me more than the wheat bran, but it has just stimulated me to make another effort. I do not propose to give it up; but it braced me up in my determination to raise alfalfa in Illinois. Our alfalfa came out all right on rolling ground. You have good pasture in Missouri. Your rainfall is about forty inches, while ours in Illinois is only thirty-two and you have the advantage of us there.

SOILING.

As to the question of soiling, I do not know that I shall say much, but I will tell you of my experience. I find as a help to short pastures, or if from any other cause I want to feed my cows in the summer, peas and oats make a palatable and a profitable feed, because cows are fond of oats and fond of the peas and especially after the peas have gotten firm in the pods, in the condition that we would shell them in the house, and I can hold up a flow of milk nicely with peas. I carry about 500 tons of silage and feed it when we are short on pasture. I can afford to feed it. As a business proposition, we cannot afford to have much pasture with us in Northern Illinois. We are pasturing a good deal more than we can afford to. There is no question about that. Many of us came and located when the land was cheap, old residents like myself, when land was worth ten dollars an acre, which is now worth \$100 to \$125; but we are farming too much as we did when our land was only worth \$10 to \$15 per acre, but we have gotten in the ruts from a business standpoint and we must change our methods. A few enterprising farmers are keeping abreast of the times, but too many are not.

DISCUSSION—OATS AND PEAS.

Mr. Haecker—Oats and peas are all right but they last only a short time, how about that?

Mr. Gurler—We put in a succession of the peas. We disc the ground first and then sow the peas and go over the ground with a drag once. We sow the peas four inches deep. After we drag the ground, we let it lie until the peas are pretty well up and then we go on and sow the oats and drag them.

Mr. —— What variety do you use?

Mr. Gurley—Canadian field peas.

Mr. Haecker—How far apart do you sow the peas and oats?

Mr. Gurley—A week, not over ten days.

SORGHUM.

I planted some sorghum this last year for the first time and I felt very much pleased with it. It is a very palatable feed. The cows are very fond of it; but I know but little about it. Have had only one year's experience, but was favorably impressed with it.

Mr. ——— How late did you feed the sorghum?

Mr. Gurler—Until into January.

Mr. ——— Did you have any difficulty with its souring?

Mr. Gurler—We left it in the field bunched. We had a fine season, no rains. I do not know what the effect would have been had we had heavy rains.

Mr. Mallory—It won't hurt it at all. I used to raise from forty to forty-five acres of sorghum. The only trouble was that it was a tremendously expensive crop to harvest. We used a mower and it took seven men to follow that mower to bundle the sorghum and seven men to tie it. I went to the Deering Company and laid my troubles before them. They said they had a machine that would do it, the corn harvester. (It was sown broadcast.) I felt sorry for the machine man, he brought a dozen men to see it work; but I told him he would have to adjust it a little. But two years after that they brought out a machine that would do the work, and now I can take sorghum ten feet high and bind it as perfectly as wheat. It does not look pretty, but it does the work. Sorghum is a good crop.

Mr. ——— How much do you plant to the acre?

Mr. Mallory—Three pecks to the acre, broadcast. Sow it with a wheat drill. I put it in the time I do my corn.

Mr. Patterson—What variety do you use?

Mr. Mallory—I use the Orange. I like that very much better than the Early Amber, the latter grows taller, but is apt to lodge. I use sorghum and Kaffir corn.

Mr. Gurler—You were with your Deering agent as I was with the McCormick people. I was using the McCormick machines and I sent for the agent to come and help me out. He finally gave it up. He says, "I could make a corn binder to bind your corn, but there is not a sufficient demand to pay us for making it." I still use the McCormick binder.

Now in this feeding question, my friends, don't lose sight of the palatability of your feed. You must know the feed that your stock likes and that they will eat heartily. Don't forget that now, by all means. That, I consider of the greatest importance. I would rather have a

palatable feed that is unbalanced, as far as the different elements are concerned than to have a perfectly balanced feed that is unpalatable.

I think of a little incident Dr. Babcock told me of. He had some young chemist under him who became interested in a kind of feed. Now the Doctor knew that it was a feed of no value, that the stock would not eat it and he said: "Boys, my old shoes will analyze, but what use are they for feed?" We must not follow one trail and ignore every other.

You should study the cost of your feed. You should know what it costs to keep your cows. It costs you less in Missouri than it does in Illinois. It costs me on an average forty dollars per year to keep my cows. I have to buy coarse fodder and ground feed.

Mr. ——— What do you feed?

Mr. Gurler—For coarse fodder a roughage of corn silage and sorghum. We have very little hay this year and my clover is all knocked out. The time my alfalfa was killed, my clover was killed also and it caused me to re-plant the whole farm practically. My clover did not stand a bit better than my alfalfa did. For roughage we feed corn silage, and until recently we have had the sorghum to feed in the middle of the day; but recently we have fed the silage and fed ground feed. We have alfalfa and wheat bran and corn and cob meal, and we are feeding Buffalo gluten feed. I had been feeding the cream gluten meal, but they have stopped making it and we have taken to gluten feed, which analyzes a high per cent of protein.

At times we feed oats instead of bran, it depends upon the price of the oats. As a rule we can buy other feeds and get more for our money than with oats. If a man has oats, he can afford to sell them and buy something else to feed in their place.

Mr. ——— Do you grind your oats?

Mr. Gurler—Yes, we grind all our grain feed.

Mr. ——— How often and what time of the day do you feed?

Mr. Gurler—Ground feed twice a day and roughage three times a day. We feed after milking in the morning and then the cows go out and the stable is renovated, scoured and cleaned up. They get warm water and are put back in the stables. Before noon they have a small feed of silage and after dinner whatever is left is thoroughly cleaned and the cows are watered in their cement mangers and they get no more roughage until after milking time.

Mr. ——— They would like to have some hay.

Mr. Gurler—I believe that is true, but I have not got it and cannot buy it because there is none. This year there is no clover hay to buy and the timothy hay that I can buy was cut so late it is not palatable and I did not get good results with it.

Mr. ——— Do your cows go out every day, regardless of weather?

Mr. Gurler—We let them go long enough to renovate the stable and get their drinking water. If it is bad weather, one row goes out and then another row. We see that every cow gets a drink when she is outside and inside too.

Mr. ——— What temperature do you have the water?

Mr. Gurler—70 or 80 degrees. I have great faith in warm water.

COW STALLS.

Mr. ——— How is the stable fitted out?

Mr. Gurler—I have a combination of the Bidwell and Drawn stall and some of my own. The gutters are cement and the whole bottom of the stables. The whole floor of the stable is cement.

Mr. ——— Can the cows get their front feet in the mangers?

Mr. Gurler—If they should start out determined to do so, they could get their feet as far forward as their nose; but they never do that.

We have an adjustable front for the mangers so that we can keep the cows lined up to the gutterings. We hold them in the stall by a chain across the rear. The stable is made with stalls having platforms of different widths, so that we can keep the smaller cows on the narrow platforms and the larger cows on the wide platforms. A difference in length of from 4.6 to 5 feet is also made by an adjustable rod in the front of the stall and we can arrange the cows so that the droppings go into the gutter and no cow will soil her bed when she lies down.

Mr. ——— What are the widths of the stalls?

Mr. Gurler—From 3 to 3½ feet. A cow that needs a five foot platform needs at least a 3½ foot width of that platform. There is no objection to width unless you get it so wide that the cow can turn around and soil her platform.

Mr. ——— What are the dimensions of the guttering?

Mr. Gurler—The guttering is 6 inches deep and 16 inches wide.

Mr. Mallory—Have you ever had the cows to slip into the guttering from straining after their feed?

Mr. Gurler—No. Because my mangers are so constructed that the cows do not have to stretch their necks. Their feed is so placed that they do not have to strain after it.

Mr. ——— What kind of bedding do you use?

Mr. Gurler—I am using saw dust. I get it from a kiln dried lumber.

Mr. Haecker—I find it cheaper to buy saw dust and cover the platform four inches deep and put burlap on top of the saw dut.

Mr. Gurler—That is an idea, giving your cow a feather bed! I never get up before an audience like this but what I learn something.

Mr. ——— You spoke of feeding oats. What do you consider the right price for oats?

Mr. Gurler—I do not want to buy any more oats if I can buy bran for the same price. The work done at the Wisconsin Station several years ago tested the comparative feeding values of oats and bran and if I remember correctly, the oats were worth 10 per cent more than the wheat bran; but you have to grind the oats, so if you can get wheat bran at the same price, you just come out even.

Mr. Glover—Oats are worth 40 cents a bushel and bran is worth 12½ dollars a ton. A ton of bran is equal to a ton of oats for feeding, and when you can get 40 cents for oats and 12½ dollars for bran, a ton of oats will buy two tons of bran. That is an illustration of getting down into the details of this business and applying business principles to it. Don't work so hard that when you get into the house you are too tired to think and go to sleep whether you want to or not.

Mr. Glover—If oats are worth $25 a ton and bran $25 a ton, sell your oats and buy bran.

Mr. ——— Where can you get bran with such a high feeding value?

Mr. Glover—I am speaking of unadulterated bran.

Mr. Gurler—Do you mean light weight bran?

Mr. ——— Here in Missouri it is run into a duster and it is so well separated that the ship stuff is a poor quality and the bran is a very poor quality. We are not a wheat producing country.

Mr. Gurler—I am afraid you don't appreciate bran.

Mr. ——— Oats are worth 30 cents a bushel here and bran is worth a dollar a hundred.

Mr. Gurler—That is an outrageous price for bran. Can't you get it shipped here from Minnesota?

Mr. ——— No.

Mr. Gurler—That stumps me. I will have to go to work and figure it out.

Mr. Phipps—Bran as it is here is not worth feeding. One pound of cotton seed meal for balancing the ration is worth 3 pounds of bran.

Mr. ——— My experience is that there is no profit in bran at the price we have to pay for it now and I do not like to let the matter rest there as it will be misleading to some parties. Bran is no feed for the Missouri farmer at the present prices.

Mr. Gurler—It would not pay anybody at that price.

Mr. Abbott—Why not balance the ration with alfalfa at $11 a ton?

Mr. Gurler—The very thing. Alfalfa is not half appreciated.

Mr. Phipps—In Kansas it is worth $7 a ton.

Mr. Gurler—Then Kansas is the place to feed it to steers. If you cannot make money there by feeding steers, I don't know who can.

THE SILO.

Mr. Gurler—As to the silo in dairying, I do not know whether it is practical to urge the use of the silo; I don't know whether you are ready for it. But I will go over this briefly. My silos are built circular and cemented inside with Portland cement, and we use 2 by 4 studding, 13 inch centers. Then we sheet inside of that with half inch lumber, on which we put a beveled lath made from this half inch lumber. This is put on with openings about half an inch between them and we place on to that the Portland cement, putting it on ½ to ⅝ inch thick. We find that this Portland cement is thoroughly impervious to water and to the air and it protects the silage from the air and also protects the lumber from any moisture in the silage, so that the lumber does not decay from damage.

If you want any more information in regard to that kind of a silo write to President Jos. Newman, Elgin, Illinois, and he will send you a bulletin that was gotten out by the State Dairymen's Association of Illinois incorporating a lot of work that Brother Glover had done in Illinois, and taking up the building of silos and estimating the cost.

Now I have been using silage for nearly 25 years. I was an enthusiast from the first. I never went crazy over it, but my confidence has been increasing from year to year and I never was so firmly fixed in the opinion that it is a necessity on the dairy farm—never—as I am now. It is just as much superior to dry feed as canned fruit is to dry fruit, or the green apple to the dried apple. That is a fair comparison.

Mr. ——— How do you like blue grass pasture? We have some beautiful blue grass pasture here in Missouri.

Mr. Gurler—I like it very well, but I want clover in my pasture. I pasture a couple of years and then I plant it in corn and if I want to raise a crop of corn, I get 15 bushels more to the acre out of clover than blue grass or timothy sod.

Mr. ——— Will cows produce more milk on clover than on blue grass?

Mr. Haecker—I know of nothing better than blue grass.

Mr. Phipps—I saw a pasture put in blue grass that had never been touched before and it is wonderful how much that pasture yileded and the results obtained from it.

Mr. ——— Do you use silage as a feed to produce the milk that you sell for infants?

Mr. Gurler—There are a whole lot of people running away with this idea that silage is not the right feed for cows. I had some trouble on that score with the second best milk firm in Chicago. One member of that firm once jumped all over me because I was feeding silage. I put up with it till I got tired. Finally I said to him: "I am tired of your bluffing. I will wager that you cannot tell the milk from cows fed on silage. There is no difference between that and other milk unless it is the sweeter of the two." He shut up.

There is no better feed for producing a perfectly sweet milk than silage fed properly. You must not leave it lying around in the stable where the milk will absorb the odor from it. There are two main causes for prejudice against feeding cows with silage. The greatest cause, I think, probably is that the farmers have their silos too large for the amount of cattle that they are going to feed. They do not feed down fast enough. They have too large a surface exposed for the number of cattle that they are feeding. You must take out a layer at a time, going over it systematically and prevent the silage from decaying. If you open it up and leave the feed exposed for a number of days, it is in the same condition that a can of fruit is in if you leave it open for a few days. If your wife sets fruit before you that has been left in an opened can for some time, you are not in good humor about it. By using about two inches of silage a day, you are safe.

Silage will freeze slightly, but I do not have any trouble with it. If it freezes on to the walls a little, throw it into the pile with some other silage that has not been frozen and it will make heat enough to thaw out the frozen part. You do not need to consider the freezing, because it does no harm.

Mr. ——— What should be the diameter of a silo for feeding 20 cows?

Mr. Glover—Fourteen feet for feeding twenty cows 200 days.

Mr. Gurler—Six surface feet should be exposed for each animal that you are feeding. If a silo is twenty feet in diameter you have practically 300 surface feet in it. Dividing that by 6 makes 50. Out of a silo 20 feet in diameter you should feed 50 cows to save in all kinds of weather. Probably in the winter time you could feed as low as 40 head of cattle from that silo all right. There is where one of the greatest mistakes has been made in feeding silage; our farmers have had too large silos for the amount of cattle fed.

Flavors in Milk—Another cause for prejudice against silo feeding

is letting the silage lie around the stable at milking time or letting some of it get out of the manger and stay there and rot. It is surprising how quickly milk will absorb any of these odors. A person can hardly believe it.

In Vermont one winter, one of the students and I detected the odor of the pig pen in our milk. I went to the management about it and found that the milk was coming from the farm of a member of the board of trustees, a wealthy man who had sons in the university and the management was afraid to antagonize him. I thought as I was there only temporarily it would do no harm if I asked the man about it, so I asked him where he put his night's milk. He said in a building where there was nothing else and he opened a window so as to let the fresh air in. It was winter time and that was all that was necessary in the winter time, to open up a window. I said "where is your hog pen." On the side where the window is? "Yes." "Now," I said, "the odor of that hog pen has gotten into the milk and we detected that odor in your milk." So many of us do not realize how susceptible milk is to odors. Put milk in an open vessel in a refrigerator and you can load it up with anything that has an odor.

Mr. Patterson—You can taste an apple in the cream.

Mr. Gurler—Anything. I was told of an incident in Vermont where a skunk got into the dairy building. When that butter got to Boston they wrote and told them of the skunk odor they found in the butter. I could talk here for an hour on this line showing the susceptibility of milk to contract these odors. I have had some incidents in my school work in that line that would make you laugh till you could not sit up.

We use soiling and silo all summer. I have about 500 tons. We should have less pasture and draw the silage out and feed it right in the field. We do not feed it in the barn; we can do it cheaper in the field or grove. Before my silage is gone I have my oats ready. I use Yankee or flint corn and I hold you do not have to have so much pasture.

Mr. Patterson—How about crowding your cows?

Mr. Gurler—They are dehorned and do not hurt one another.

Mr. ——— Do you feed green oats?

Mr. Gurler—Yes, sir. We feed it with the peas. We have never had any trouble with them.

Mr. Patterson—What do you think of green rye?

Mr. Gurler—I have had very little experience with it. I had my cows break into a field once and had some trouble with them.

One time our pasture got short and we had a pasture we were holding for an emergency; it was largely white and red clover and my fore-

man turned the cattle in and let them gorge themselves with all that clover. Next day I got a complaint from Chicago "There is some bad flavor in your milk." If I had known it, I would not have let the cattle stay in the field more than a half hour.

Mr. England—If you turn the cows in a rye field after milking time, you will have no trouble.

Mr. ——— Or at noon.

Mr. Gurler—*The care of the Cow*—I do not feel that I need to say much more but I may emphasize what has been said. You must treat a cow kindly in every way, if not she gets it back on you, she cannot help it. You cannot abuse a cow and get good results; she pays you back the next time you milk her. Not only that, but in my high grade work of producing milk for infants, I know that when a cow is abused her milk is not fit to feed a baby. I can treat and feed a brute mother so that the milk will make her own young sick. I know that to be a fact, and what will make the brute young sick will make the human young sick. One of the causes of my success in this infant feeding work in Chicago is the care that we take with our cows to keep them in a perfect condition—to keep their systems in as fine condition in winter as in summer. The cows are all treated kindly. We won't let our men go after the cows with a horse, let alone a dog. Cows can be brought up as fast as necessary with a man on foot.

The cows must be made comfortable in every way. When I see a man running after a cow and the cow getting away, I know he has abused the cow or she would not be afraid of him. I won't continue such a man longer in my service if I can find some other man.

Mr. Haecker—How much do you get for your milk?

Mr. Gurler—Twelve cents per quart. By the pint it sells for seven cents, making 14 cents a quart. My agents get three cents a quart for distributing the milk. My milk is distributed by milk dealers. We have a little receiving room outside of the bottling room where the milk is emptied without the deliverer of the milk going into the bottling room at all. It is emptied into a little vat there and from there it runs through the separator and from the separator through the cooler which cools it down to 40 degrees in summer time when they need to cool it that low. From the cooler it runs into the bottling machine and then the bottles are kept with the wood pulp caps and on top of the bottles are put tin seals. This is a circular disk covering the top of the bottle with four arms extending down below the rim and the tin strip running around connecting these arms below the rim and this tin strip has a lead sealing in it. The strip is drawn tightly, bringing those arms close to the neck of the

bottle below the rim of the bottle and thenthis tin strip is drawn taut and slipped over this red seal so that it is impossible to get this metal top off without breaking the seal. These metal caps that we use as a precaution, are manufactured in Chicago all complete to use, with the exception of the date, and we stamp the dates in the blank place left on them for that purpose daily. By this daily stamping on the bottle, the consumer knows the age of the milk that he buys and there is no chance for deception. The metal seal is simply put on to prevent anyone from tampering with the milk and to insure the consumer as to the age of the milk. If one of my agents tries to sell old milk to my customer and there is anything wrong with the date, the customer will not receive it.

A word further in regard to the care of the cow. The cows must be comfortable all the time. Make them happy. You *must* do it. It will pay you to do it, and you will pay for it if you do not.

Mr. ——— What difference would the age of the milk make so long as you maintain the proper temperature and keep it in a pure atmosphere—it is still kept sweet?

Mr. Gurler—No difference to you or me but to an infant it does make a difference. Dr. Reynolds, Health Commissioner of the city of Chicago. made a statement a few months ago that milk may be unfit to feed a babe long before any acid has developed. I believe there is such a thing as vitality in milk. There is a remarkable difference in infant feeding between the milk of a strong cow and a weakling that can just barely crawl around. Years ago the medical men would not accept that, but a majority of them now agree to that. I want cows for this business that have vigor and vitality and I *will* have them. I will not have a weakling in the herd.

Mr. ——— How long after milking before the milk is delivered?

Mr. Gurler—We deliver the night's milk the next morning. They deliver before five o'clock, a part of it is 24 hours old and a part of it 12 hours old. The night's milk comes in and is delivered the next morning. The oldest of the milk will be only 24 hours old and the night's milk only 12 hours old. That is as fresh as you can get milk unless you have your own cow and milk every time you want to feed the baby.

Mr. ——— Will milk lose its vitality in 24 hours?

Mr. Gurler—That is a fine point. We know nature provided for the young to get their milk direct, which, not being exposed to the air, does not need any aeration. The nearer we can get to what nature has provided, the better. It is a fine point. People producing milk for butter making do not have to go that far, but for feeding infants, you have to go further.

Mr. Haecker—That is one reason why I do not feed the calves at noon, because I would have to feed milk that had been standing around for six hours.

Mr. Miller—Applying the same rule to milk fed to calves as to infants, the milk that we get from any separator and use right then is better than if it had stood a little while, the older it gets, the less vitality there is in it.

Mr. Gurler—You skim your milk and feed it warm to your calves. You just try that yourself sometime. Be blind-folded and let some of your family give you a glass of the warm separator milk and the warm new milk and see if you can tell which is which.

Mr. ——— Is there any difference in the vitality of milk in six hours?

Mr. Gurler—I cannot prove that there is, it is a hard thing to prove, but I have stated it as a belief of mine and I find there are many people coming to believe as I do.

Mr. Phipps—Is there any competition among your customers because of the morning's or evening's milk?

Mr. Gurler—We keep them separate. The evening's milk is sold by the pint, the morning's milk by the quart and customers can take their choice. Now in the stable I think these are important points.

Ventilation is an important point.—This idea of sealing a cow's stable and giving her so many cubic feet with no change of air, it is time to explode. Put in a system of ventilation that will give your cows a change of air and they will be all right. The King system of ventilation is the best I know of. You want your cow stable as light as your dwelling house. For King's system of ventilation, write the Wisconsin Agricultural College or Hoard's Dairyman.

Keep the Cows Clean—You must keep the cows clean if you would produce good milk. We consume more filth in milk than in any other article of feed. People talk about the animal odor of milk. A few years ago I was visiting with a cheese maker who lives on the Northwestern Road and he was telling me that he was having trouble with his cheese and his milk was being ruined by a bad odor. I said to him: "You know what that is don't you? That is filth, pure and simple, cow dung." Pure milk does not have unpleasant odors when it comes from the cow.

Several years ago in the city of Berlin, they had a medical man to investigate the milk supply. I will never forget one of the closing sentences in his report. He said: "The people of the city of Berlin are consuming in their daily milk supply three hundred weight of cow dung." It was not very elegant, but it was true.

Temperature of the Stable—I wish some of the agricultural colleges would take up this matter and show what temperature gives the best results. I know of no work on such a subject except one written by an Englishman from ten to fifteen years ago. He said his cows produced more milk in a temperature of 63 degrees than 52. That is all the data I know in regard to that, but I think it is possibly an important item. You must not treat your dairy cow as you do a fat steer. Any steer that has a couple of inches of fat can lie in a strong draft and be comfortable, but you put a dairy cow there and she is frozen up. What is comfortable for a working horse or for a steer is torture for a dairy cow. We have something to learn in that field yet.

Milkers—I have trouble with milkers and it is a question how to control it. There are men who cannot milk well that try it. They do their best and cannot do a good job—but there are a good many more who do not try. I have known a difference in the individual milkers in the results of their work in the way they shrink up cows, so that if a man was milking fifteen cows the difference between a good and bad milker would pay a salary for a year. Right now my milkers are competing for prizes. The milk is weighed once a week by the foreman—we don't trust the milker to weigh it—and we give a prize of $25 for the milker who brings his cows through with the least shrinkage. Prizes of $10, $15, $20 and $25 I give to the milkers. It keeps them interested in their work.

Mr. ——— Do you have trouble with over-feeding?

Mr. Gurler—No. The cows get all they can handle. There is not much danger of over-feeding.

Mr. Haecker—A cow should have all she wants as well as a man.

Mr. Gurler—In raising heifer calves, you cannot afford to under feed.

Mr. Patterson—How do you raise your heifer calves?

Mr. Gurler—From my best cows. I do not raise them from poor cows. If I have not enough, I buy some.

Mr. ——— What breed?

Mr. Gurler—Holstein males.

I had my foreman give me figures in regard to these heifers. I have some cows with their first calves that came in last April, giving 18 to 20 pounds of milk; some fresh ones are giving 25 to 30 pounds and those heifers of my own raising are right up with and a little past the whole herd.

My cows are coming in at all times of the year. I have to have a uniform amount of milk. I cannot have them all fresh at one time, as I used to when I supplied the creamery.

Maintaining Soil Fertility—Now there is another point I wish to touch on, and that is fertility and then I am ready to close. A short time ago I went down to attend a meeting at Champaign, where we have our university, and got to talking with some corn growers in the state, and one of them—he is one of the largest corn growers in the central part of the state too—said to me: "You grew more corn to the acre last year in the northern part of the state than we did in the central part of the state." I was surprised, we were not supposed to be in the corn-producing part of Illinois at all and our part of the state has not the same fertility as down near Champaign, and some of those counties. I found in the past few years that there was not much profit in feeding steers, and they have been selling the corn from their farms and we in the north part of the state averaged ten bushels of corn more per acre than those in the central part of Illinois. There is no profit in growing 30 bushels. Forty bushels makes ten bushels for profit, sixty bushels makes 30 bushels for profit; there is three times as much profit in sixty bushels as in forty. We have got to do better work along this line.

A man near DeKalb had a rented farm that he had been working for fifteen years. Nine years ago he had a lot of cows on that farm, feeding them all he grew and some besides. He was then getting sixty bushels of corn to the acre. Since the high prices for corn, he has been selling his corn. I said to him: "Mr. Jones, how much per acre does your corn yield?" "Forty bushels." "Why have you tumbled down." "I have been selling my corn—have been checking out of my bank of fertility and putting nothing back into it." We cannot afford to do that.

A banker one day called me into his bank about two months ago; he said he wanted to talk with me about fertility. I found out pretty soon that he had several farms that he was renting and the renters had been corning off these farms until they were runied—they could no longer make money on them, and he was having trouble in finding people to rent them at a fair rent. I said to him, "You cannot allow your farm to be treated in that way; there is no more sense in that than there is in a man continually checking out of your bank without making any deposits." That is as true with farming as it is with banking.

Dr. Bernays—Aside from its great cleanliness and the great pains taken to keep out dirt, what gives your milk its great keeping powers?

Mr. Gurler—*Cooling*—Merely rapid cooling. The milk that I sent to Paris, we took no pains in its preparation. Until we took the bottles out with the sealing paper, we did not know what cows or milkers it came from. But when we were ready to take that milk and continue the cooling in ice, we put it in with salt added, putting it down to as

low a temperature as possible as quickly as we could from the cow. It was bottled and put into the case with chipped ice around it. We ship-it by express to New York. It was four days before it was put on a vessel and seventeen days afterward it reached Paris. It was kept at a temperature of 25 degrees by the refrigerator. From South Hampton to Paris I never learned how it was transported. Mr. Alvord had charge of that work.

Dr. Bernays—Did you run it through the separator?

Mr. Gurler—Yes, for the purpose of standardizing. It is necessary to have a fixed standard of milk that is to be used for feeding babies, and we also furnished a cream with a fixed standard, so as to aid the doctors. If the fat in the milk is an unknown quantity, they cannot work as intelligently. That is what we put it through the separator for.

My dairy is now up to four per cent butter fat, and I do not know any way that I have accomplished that only by weeding out the unprofitable cows.

Dr. Bernays—Do you cover your pails?

Mr. Gurler—I use a pail with an eight inch opening and on that we put a layer of absorbent cotton held between two layers of gauze. The pail has a covered spout through which we empty that milk into the can.

Dr. Bernays—What is your cost of cooling per quart of milk?

Dr. Gurler—I do not believe I can tell you. I have not my work figured down to detail as to the cost of the different items. I simply know what my balance is at the end of the month, but have no time to go into those details.

Dr. Bernays—How much ice do you put up?

Mr. Gurler—700 tons annually, and we use that up in shipping 1,500 quarts per day from 160 cows.

Mr. Miller—Have you ever had any experience with wild onions in the pasture? How do you get the odor out of the milk, or cream, or butter? I believe it would be a great benefit to the association if you would tell us a way to get rid of it.

Mr. Gurler—I have no wild onions. My farm is all tillable land.

Mr. Patterson—If you take your cows off the pasture an hour before milking time, you will have no trouble with the flavor of wild onions in the milk.

Mr. Lane—I can certify to that fact, but we usually make it two hours instead of one. New Jersey is a great place for wild onions in the fields and pastures, and the cows were bound to get those onions, but we found if you take them off the pasture two hours before milking time, there would be no flavor in the milk from the onions.

QUESTION BOX.

Q. (By Mr. Curry)—What advice can an experienced person give a man who has never had any experience as a dairyman regarding the selection of his cows.

A. (By Mr. Glover)—That is a difficult question to answer. In the first place much depends upon the individual liking. Have you studied any particular breed or formed any opinion as to what kind of breed you would like?

Mr. Curry—Yes, for two years.

Mr. Glover—Have you any liking for any particular breed? Select one of the four dairy breeds which have already been developed; there is no excuse for trying to breed up one of your own. You could take a Hereford and your children would be old before you could make a dairy cow out of her. If you like the Holstein breed select that kind, or the Ayrshire, or Guernsey or Jersey. Study the characteristics of each breed; we cannot tell any more which one would suit you best than we could tell what kind of a wife you would like to live with.

Mr. Marple—Mr. Curry is what I call an up-to-date dairyman. He has had two years' experience in dairying. Mr. Curry, what kind of cows have you now?

Mr. Curry—Mostly Jerseys.

Mr. Glover—Then continue to buy the best sires you can get, whose mothers, grandmothers and ancestors away back were good performers and vigorous cattle, and keep on with such selection. You will find that you have some scrubs and once in a while an animal that has been bred right that does not come up to your expectations. Try her a little longer. The Babcock test and scale are only guides in selecting just as conformation is, but an animal that stands a good test with a pedigree back of her is pretty apt to have prepotency.

Mr. Curry—Would you in-breed?

Mr. Glover—If I had a vigorous sire that was an excellent animal I would in-breed. I am not as much a believer in in-breeding as perhaps is Mr. Haecker, but at the same time I will say that if you have a good sire you can perhaps fix characteristics more quickly and firmly by in-breeding. Do not run any chances with a sire that has not proven himself. A proven sire is a good thing.

Mr. Curry—Give me an idea how to pick out a type for a dairy cow.

Mr. Glover—We could do that better if we had a chart or an indi-

vidual cow. A dairy cow tends to be spare and angular. She tends to be wedged-shape. Whether it is necessary for her to be wedged-shape, spare and angular, it is unnecessary to discuss—we know the cow that has the highest production of milk and butter tends in that direction. A cow that is engaged in making milk does not need a wide back for making sirloin steaks. Her vocation is milk-making, and she wants to convert her feed into milk. She should therefore be spare, angular, tending to wedged-shape, with a deep, long body, which indicates large digestion, and then we want a well developed nervous system. The eye indicates that. You can gain a great deal of knowledge of a cow by looking at the eye and head. A man's face sooner or later in life reveals his character, whether it be strong or weak. A dairy cow should have a full, prominent eye—not too open, not too quick—not too sleepy, not too phlegmatic. Brother Haecker called my attention last summer to the difference between two cows: One of them took five minutes to knock a fly off of her head while the other one had her fly off before the first one got started. I had never noticed that difference before.

Mr. Curry—Her temperament is also shown by the number of times she chews her cud—the quickness of her movement.

Mr. Glover—A lean man has a different temperament from a fat man. A dairy cow should not have a tendency to fatten. A dished-faced head is not a good indication. She should be wide between the eyes. Notice the vertebrae through which the spinal cord runs and from which the nerves are sent out to different parts of the system. It should slope to the tail, be strong and prominent, showing a well developed nervous system and a good, strong back. We want a strong back in a dairy cow. A cow that is level on the back does not indicate a good milker, but it indicates that she has a heavy load on her back bone and that has a tendency to make her sway back. Aim to have the back strong enough to support the digestive organs. A tail well down shows a well developed nervous system, also the distance between the feet. The general appearance of a good dairy cow is looseness.

Mr. Curry—How often do you test the cows?

Mr. Glover—One week every nine weeks, estimating four weeks back and forward, covering a period of nine weeks, or practically a month back and forward.

I like to see an udder well up between the hind quarters. I like to see it lie in folds when it is empty—not a meaty udder. I like to see the four teats evenly placed. The udder is an important thing. It is better to select a cow with a good udder than one with an inferior udder. The milk veins leading from the udder indicate the blood supply

for the udder and the body. Notice the size of the milk veins and whether they are branching and torturous or not.

Q. What is to be done with pure, sweet milk, either by the shipper or dealer, which tests 2.8 per cent of butter fat, just as it comes from the cow, when the legal standard is not less than 3 per cent butter fat for whole milk and 1½ per cent butter fat for skim milk?

A. (By Mr. Mallory)—You cannot sell that milk to a dealer at the standard price in St. Louis. Those are the rules, and they are trying to abide by it. In Kansas City there is no provision along that line and yet a man from Kansas City today told me that they had a stronger rule than an ordinance there, from the fact that if their milk went below four per cent they could not sell it. If I had cows that were giving such milk as that I would certainly dispose of them. I could not do anything with them. My milk is running at 6.8 per cent. I do not believe there is any money in shipping milk or cream, or selling it any way when you have that low a grade of milk.

Mr. Glover—Can you not standardize it in the separator?

I once served on a dairy and food commission, and I looked after the milk, and I know many times I found milk not coming up to the requirements of the law; but when the milk came from the animal just as she gave it, we never brought suit against the dairymen. I do not believe there is any law on earth that will affect a man with low grade milk, if he brings it just as it came from the cow.

Mr. Washburn—Put in two or three high testing cows, enough to bring up the herd 2 per cent. As I said this morning, we had one cow in our herd that averaged only 2 per cent butter fat during the entire month of December, but the whole herd averaged 5.1.

Dr. Bernays—It takes milk from 6 to 9 cows to fill an eight gallon can. Our milk seldom runs below 8 per cent. Before long we hope to have a law whereby it will be a punishable offense to sell milk testing less than 2.5 per cent, from one state to another.

Mr. Phipps—I would like to say in Kansas City, we have a milk ordinance requiring the milk to test 3 per cent. We have dairymen arrested for selling milk that tests less than 3 per cent.

Mr. Stone—Is there a butter fat skim milk standard in Kansas City?

Mr. Phipps—I do not know.

Dr. Bernays—I have recommended the repeal of that whole section about selling skim milk in a city. The inspector will find one can labeled skim milk and another labeled whole milk. Let him sample it and he can tell if there is any fraud. Whole milk is whole milk according to the ordinance, and skim milk, skim milk.

New York prohibits the sale of skim milk entirely, Kansas City also, and that law has been upheld by the State Supreme Court. I know that skim milk has a great food value, and I deplore the fact that dishonest people will mix it with whole milk.

Mr. Stone—The United States Government defines skim milk as "any milk from which a part of the cream has been removed." The moment you remove any cream you have skim milk unless you fix a definite standard for the ingredients. If you touch it at all, it is skim milk, according to the definition of the United States law. Therefore the United States Government fixes a standard—not a butter fat standard, but a solid standard.

Dr. Bernays—I would be in favor of permitting the sale of skim milk if a scheme was provided by which whole milk and skim milk could be separated. Suppose a physician tells a mother to buy whole milk for her child and dilute it with water—if the fraud of skim milk has been practiced upon her the child will not have enough sustenance in the milk to sustain life.

Mr. Miller—For what purposes are city ordinances drawn up? There is only one ground in my opinion, and that is the public health. I would like to know if skim milk is not a wholesome article?

Q. What would be fair wages for a man to superintend a dairy of 40 to 60 cows, to have full charge of same, witth board and room?

A. (By Mr. Gurler)—I do not know that anybody can answer that question without knowing the man. Some men are not worth anything, and there are other men that you can hardly over-pay. To superintend 40 to 60 cows and have full charge of the dairy and be furnished his board and room—how much does the proprietor know about the business?

Mr.————Nothing.

Mr. Gurler—Then he ought to pay a man a thousand dollars a year and feed him.

Q. You advise cutting timothy hay in bloom. Do you mean the first or second bloom, and why?

A. (By Mr. Glover)—It means that when the timothy hay first begins to bloom it should be cut. Why? Because the nutriment in it is most digestible at that time.

If a farmer allows his timothy hay to become well ripened it is then no better than wheat straw and not so good as oat straw. Wood—that box over there—has a certain amount of nutriment, carbohydrates, etc., and will analyze all right, but we know a cow could not eat that box and make milk out of it. It is not valuable as a food stuff. My old

shoes would analyze, but are not good for feed. If you permit your timothy hay to ripen you bind up the nutriment in it so the cow cannot use it.

Q. If we sow clover are we going to exhaust our land?

A. There are no plants grown that are so beneficial to our soils as the legumes, and under that head comes not only the clovers, the enormous alfalfa, mammoth clover, but vetches, cow peas and a great many other plants that I do not now recall. How did you get that idea? It is this way, whenever you grow clover and sell it from your soil, it will exhaust the soil very rapidly. You are drawing on your bank account much more rapidly by growing clover to sell than timothy hay. Why? Because it contains a larger amount of protein, and that is made from nitrogen. Let us see if there is not a check manner of handling it so as to yield not only a crop, but add fertility to our soil. Growing on the roots of the clover plant are little bacteria—living organisms—little beings that live and grow the same as animals develop whose function is to gather the nitrogen from the air. There are 12 pounds of nitrogen in the air for each square inch of earth surface. Think of the amount of nitrogen in the air! We have growing on the roots of the clover plant a germ that takes the nitrogen from the air and deposits it on our soil. If you buy the nitrogen—the most important element of plant food, without which you cannot grow a spear of grass or anything else—on the market you pay fifteen cents a pound for it, and yet by the growing of the clover plant, grazing live stock upon it and putting the clover back upon the land again, you can grow it without any exhaustion to the land whatever. If you grow it for the nitrogen and make no use of the clover plant, it will cost you 1½ cents a pound to get the nitrogen from the air as against 15 cents a pound if you buy it on the market, but your clover fed to live stock will be more valuable. It is a poor farmer that will take the clover from his land and sell it. He is no better financier than the person who keeps checking out his bank account and putting nothing in. That is exactly what many farmers are doing. When you sell 500 pounds of butter, which is equivalent to 100 bushels of corn, you are selling from your land fifteen cents worth of fertility; butter is nothing more than condensed sunshine. If you sell 500 pounds of whole milk, you are selling eighteen dollars worth of fertility. It behooves you to get a fair price for it because skim milk has a value as a fertilizer for your calves and for your land, and by the use of it you are depositing a bank account. I care not how rich your soil, if you keep drawing upon it without replenishing it, sooner or later you will reach the bottom.

Let me give you an incident in my own state of Minnesota. My father was a wheat farmer in the southern part of that state when I was a boy, and as a result we had chinch bugs and a depleted soil. A man once met my father and said to him: "Jim, just as soon as we cannot raise wheat any longer we might as well quit." My father moved to Dakota where he could raise wheat, and then he came to his senses and went into the live stock business. In Steele county, Minnesota, their soil became so depleted and had so many chinch bugs that they could not raise corn successfully, and they were about to starve. There was not a single farm that was not mortgaged and the farmers did not know which way to turn to get out of that condition, and some way of making a living began to appeal to them. They turned their attention to dairying and now that county raises more cows and supports in her eighteen townships more live creameries and raises more wheat than ever in her history before. In Freeborn county the farmers were so hard up that when a man wanted to borrow money out of the bank, if there was no milk on his shoes the banker would not let him have it, and if he had the milk on his shoes they would let him have all the money he wanted.

MILK FEVER.

Some one has asked me about the milk fever treatment. Milk fever has been a dreadful disease among dairymen, and a disease that we have known but little about. We call it milk fever, an improper term. We also call it parturient paralysis, which is an incorrect name. We have no name that gives the true nature of the disease. It is a dreaded disease, destroying the most valuable cows in the herd. We have several treatments for it. Some people give the cow medicine for this disease, a very foolish thing because she is paralyzed and cannot swallow, and the medicine goes to her lungs instead of her stomach. Another treatment is the potassium iodide treatment. They seem to cure a great many animals by injecting a little potassium iodide in warm water. Then there is the oxygen treatment, the pumping of oxygen into each quarter of the udder until it is distended so full that you can see it working through the skin. Finally we became convinced that that was not necessary. Then we discovered the fresh air treatment. Every farmer ought to have a bicycle pump fixed with the tubing and on the end of that he can put a small milking tube or goose quill. Put your bicycle pump in boiling water and let it remain there five minutes so as to sterilize it in order that no bacteria may be carried into the udder. With this pump you inflate one quarter of the udder until it is fairly well distended, then the next quarter, and repeat this until all four quarters are fairly well

distended, then give the udder a thorough massage, rubbing it well. I forgot to mention that all the milk from the udder should be removed before any air is forced into it. Rub the udder thoroughly and that is all there is to it. You do not need to do anything else. If you can remove the excreta, well and good. If the cow does not get up in an hour repeat the injection. I have never known of a dairy farmer who has tried that treatment without having great success. It is a very simple treatment.

Mr. ———After you force this air into the udder, if the cow does not seem to recover, do you take it out and repeat the inflation again?

Mr. Glover—Yes. The air will ooze out at the end of the teat in time.

Mr. Patterson—I find it necessary to use a rubber band to keep air in.

Mr. Glover—I do not think that is necessary. It will come out slowly, not with a rush. This is a good treatment for udders that have become feverish and hard. It is also recommended for garget.

Mr. Gurler—I want to emphasize what Mr. Glover has said. I have lost a good many cows fom milk fever. Once when I was in Chicago in a wholesale packing house some party called my attention to the oxygen treatment and I bought a can and apparatus which cost me $10. I have not lost a cow since. Since that time has come the fresh air treatment that costs nothing. I want to tell you of one case to show you how it does. A man one day called me up over the 'phone and told me he had a cow down with the milk fever and wanted me to give her the oxygen treatment. My foreman went over and found that cow not in the barn, but in a draft on frozen ground, in the worst condition. They got her into the barn and treated her for a couple of hours and she came out all right.

Mr. Glover—We get such reports constantly. In nearly every case the Jersey cows come out all right and never show any ill effects from the treatment.

Mr. Graves—We had ten cows down with milk fever out of the herd of forty-two cows at the World's Fair. We saved them all, and they showed no ill effects afterwards.

Mr. ———You do not need to use a bicycle pump, you can just take a common syringe. We use nothing but that. One of my neighbors had a cow down with the milk fever and I took a common syringe and forced the air into her udder, repeated the operation, and she was well in two hours.

Mr. Graves—For treating udder troubles oxygen is good as far as it goes. I bought some cattle in the East and among them ten cows,

and one of the young cows freshened on the car with her second calf. She was on the car during this excessive cold weather and came along the shores of the Great Lakes. That cow happened to be tied just at the car door. If any animal should have been away from the door, she should; but she happened to be there and took cold. She had a badly conjested udder so that not a drop of milk could be squeezed from either teat. We got a few drops from one teat, but the other could not be budged. We worked faithfully three days without results and we could not get it with the milk tube. Then we went over in town and got a remedy we had used in St. Louis. I had used it before, however. It is commonly called Denver clay or antiphlogistine.

I have seen that tried at home and on all sorts of cases of that kind and have never seen anything approach it in result. The udder of that cow was in a frightful condition. I can hardly make you understand it, and when I left home she was milking freely from three quarters and the other was almost restored. I firmly believe she would have been ruined under other circumstances.

One of our cows was being led out for exercise one day, and while passing a horse barn where a young fellow was throwing a bucket of water and she got part of it on her face. She was frightened, the ground was rough and she side-stepped, as the boys say—crossed her hind legs. It threw her down and caught her udder and in less than two hours her left hind quarter was swollen up the size of an ordinary stiff hat. We commenced with hot water as hot as she could stand and alternated hot and cold water for several hours. I got on the car and got some antiphlogistine.

Mr. ———How do you apply it?

Mr. Graves—We use hot water and massage. Then we put on the antiphlogistine as warm as possible, and put a nice thick layer of absorbent cotton over that. We used an udder protector so as to hold it there. That quarter was something terrible.

Mr. ———Do you make more than one application?

Mr. Graves—Yes. We used three of the small cans. Try that remedy for all kinds of trouble like that.

Mr. Patterson—Can you buy it in any drug store?

Mr. Graves—You can in any of our drug stores at home, and I presume you can get it anywhere else, but they never handled it until we called for it.

FLY REMEDIES.

Q. Will it pay to keep cows in the stable in fly time with screens on the windows?

A. (By Mr. Gurler)—In regard to that I will say several years ago I went to work to demonstrate whether or not it paid to keep cows in the stable during fly time. I did just as careful work as I knew how. I kept a stable with 64 cows, in four rows. We kept our stable dark and had a system of ventilation going on and did all we could to keep flies out. One-half of our cows we turned out at night and kept them in the stable in the day time. The other half we let go out into the grove both day and night. I fed them in the orchards in the grove. I took the silage out there which we were feeding, as feed to help out pasture. We weighed the milk, keeping the account of the daily milk flow of each half of the herd. We took as a basis, I think, the two weeks previous to commencing this work and reckoned from that the decrease or increase of each half, the one confined in the stable and the other running in the grove and taking their chances with the flies. When I got through with this work, to my surprise I found the cows confined in the stable gave two ounces per day more milk than the half that was outside. I made up my mind that it would not pay me. That is only one experiment and I want you to take it at what it is worth. I have never undertaken another. I am satisfied that it would not pay me to do it.

Another thing in regard to this fly business. A fly remedy will only keep off flies for a couple of hours. It has to be so you can apply it so as to keep the cows unmolested while milking and after milking time is over the flies will work that much more lively and the cow is in so much more misery. I hear men say that these fly remedies will keep flies off for twelve hours, some say 48 hours. They don't do that for me. I do not find that kind of remedies. If anybody has them I would like to have one myself.

Mr. Graves—I find in putting cows in the barn, if you screen the door and do it the right way, it makes more flies in the barn than outdoors. It just keeps them inside. We found that our cows did a little better on the outside, and we watched our record closely.

I agree with Mr. Gurler so far as fly remedies are concerned. They sent us all kinds and quantities free of charge, but we found them to be a positive injury. If we used them strong enough to accomplish the purpose, we blistered the cows, and aside from that we closed the pores of the skin in the cows so that we could not keep them in condition, and we abandoned all fly remedies whatsoever. Later on in St. Louis, we put in electric fans. I think, Mr. Gurler, you are perfectly right about fly remedies.

Mr. Smith—I just want to say a word. My observation has been that a bunch of flies will get hold of a cow and remain there—will follow

a cow from day to day. If she scares them off, they will go back to that cow. I have a simple little remedy. I take a lot of old gunny sacks and tack them over the door and let them hang way down. That scares the flies off the cow. They go to the end of the barn and do not go back to the cows again. The end of the barn will be covered with flies, but they will largely leave the cows.

Mr. Gurler—What becomes of them?

Mr. Smith—They do not go from one cow to another a great deal. They don't live long.

Mr. Gurler—They live long enough to leave a large progeny. I do not mean to laugh at anybody's experience. Not at all. We can all profit by each other's work.

I thought it proper for me to say something along the line of certified milk about which Mr. Bernays spoke. I was the beginner in this high grade milk in Chicago, and I had some interesting experience, and I will give you some of my experience and then I will touch a little on the line of the opportunities here in St. Louis. You understand that I produce this milk mainly for infant food, and I explained yesterday a great deal of the care that we exercise to have this milk right for the babies, and there is more to that than you would think—more in the feeding of the cow to produce this milk than you have any idea of.

I learned thirty-five years ago that I could feed the brute mother so that her milk would make her own young sick before it would make her sick. I did that on the farm. Before I entered into this certified milk business, I tried to work out the experience that I had learned in my dairy work for a long term of years. I could go home and feed my cows so that in a week I would have twenty-five babies fed from it, sick. I know I can do that. And we take as much pains to feed our cows so as to keep them in perfect condition as we take in any of the work connected with this business. It does not matter whether it is summer or winter, we aim to keep those cows in perfect condition. Some time ago there were two dairy commissioners who visited our farm, one from Illinois and one from Minnesota, and after going over the cow stables, one of them remarked: "What perfect condition your cows are in! The droppings look as though they were on pasture." I said: "We watch our cows, and if a cow becomes constipated, we remove the trouble, or if she has diarrhea, we remove that trouble—we do not allow any trouble to exist with our cows when we are making certified milk." You understand why that is so. Of course, this is advanced work, and for ordinary work—milk to go into the creamery—you do not expect that much care, but there is room for improvement in the care of ordinary milk, and it has got to come.

I have had some experiences with feeds for the cows. I remember particularly two or three incidents. The first one was one of the biggest surprises of my life. A little babe had been taken sick, a child not old enough to talk or express itself in any way. The doctor prescribed the certified milk for that child. The father was a laboring man, not earning large wages, and having no money to waste. They put the babe on our milk and it recovered and was thriving, then they thought they could not stand the expense and put the child on plain milk. It would spit that milk right out—would not drink it at all nor have anything to do with it. It was the difference in the taste. The taste of a little babe is much more delicate than ours.

I will tell you another incident. I have two little grandsons who were raised on this milk and never knew any other, and one time their father and mother were invited out to visit one of the wealthy families in our city where they had their own cows, cared for right up-to-date. They set that milk on the table for these little boys, they took one swallow of it, put it aside and would not taste another mouthful. They had been well enough trained not to make remarks and did not say anything, but they would not drink any more of it. I mention these facts to show you the difference in this milk.

I will tell you an incident that happened in my early experience in Chicago. Dr. Gurman was the city bacteriologist of the Chicago Board of Health. He had one of my patrons come to our establishment and ask for twelve quarts of milk. They had it put in a can and taken away, and did not let anybody know who wanted it, did not even let us know that they had gotten the milk. I did not know it myself for six months. Dr. Gurman told me that milk went up to the city health department, the top floor of the City Hall in Chicago. They put it in the refrigerator and tested it for acidity and bacteria and percentage of butter fat. The last quart was two weeks old when they tested it and after applying their test, Commissioner Reynolds and Dr. Gurman then tasted it and said that it was as sweet as a peach. I mention this to show the possibilities of certified milk.

Marvin Hewitt, junior son of the president of the Northwestern Railroad, in going to his summer place near Lake Superior, told Mr. Allen, their agent, to get a case of my milk. It was sent ten miles into the woods. Mr. Hewitt got home and called Mr. Allen and said: "Don't you suppose that milk is spoiled?" But it was not, it kept sweet ten days and the last bottle was the best in the case. He sent for me when I was in the city and persisted that the last bottle was the best in the case. There could be no foundation for that, only that the cream had become more solid. I mention these facts to show what care-

ful handling and low temperature will do for milk. That was the secret of my sending milk to the Paris Exposition—cooling it to 35 or 40 degrees and keeping it down to that temperature.

I will tell you an incident that happened recently in Chicago. In a certain hospital some people were feeding babies—doing charitable work—and they use my milk. Then there came a new milk into the field—I won't tell the name of the firm, for that is not fair—but they succeeded in getting a small amount of that milk in this hospital instead of mine, but the babies did not thrive on it and they had to drop it and go back to mine. I give you these facts to show that there is something to this. There is no question about it.

I will now touch a little upon the opportunity here for furnishing St. Louis with certified milk. You are 224 miles from St. Louis—probably too long a distance, as certified milk will probably be made nearer St. Louis, but there may be some market here.

In Chicago when the medical profession tried to induce me to go into this work, I felt afraid of my ability to succeed in that line of work. I talked it over with the men I had worked with in the dairy school work in Wisconsin, Vermont and Pennsylvania—men who had seen me under conditions that showed all that there was in me—and all that they would say was I was better qualified to succeed than anyone else. Not one of them would say, you can make a success—they all said you can make a success if anybody can—but there was that awful word with two letters in it—i-f—on which everything hung. I finally went into the business.

Then there came the problem of delivery. The medical profession thought I must deliver my milk. I thought of making an agent of some milk dealer so that my milk would be put on the wagon to be delivered where the milk was wanted and not need a special trip. I could see that if my milk was taken all over the city before being delivered that it would be ruined. The medical profession objected to my plan and I said, "Gentlemen, if you insist on my delivering the milk on my own wagons, I will not undertake the business." They let me have my own way. If I had undertaken to deliver that milk, I would have been flat on my back eight years ago. I would not have had money enough to have gotten on my feet in this work.

I tell you what I think, because I do not want to see some brother dairyman get into a place he cannot get out of. I give you my experience, and if it helps anybody, all right.

THE BABCOCK TEST.

Mr. Marple—I want to say that the Babcock test is the only method to determine, as far as I know, the value of milk or cream so far as

butter fat is concerned, and I have been taught that it is absolutely correct, but I think it is abused in the minds of people sometimes who are selling butter fat, and there seems to be abroad an idea that there is a variation in this test, and I hear all over this country a good deal of talk about the value of cream as bought by different markets for different purposes, and I hear a great deal of stress put on this test, and I am led to believe, as a conscientious worker in the interest of dairying, that it might become a deplorable thing. You never hear a man talk about taking his corn to one place because it weighs more. A man does not ship his stock to Chicago instead of St. Louis because it weighs more. He does not exchange one pair of scales for another because of a difference in the scales, and if the Babcock test determines absolutely the butterfat value of cream or milk, there is not a particle of difference what test they use if they know that the test will be honestly made. So the question ought to be done away with where a man will get the best test. There is but one test, and any man who would willingly and knowingly over-rate the butterfat in milk, would under-rate it also, and the one is just as dishonest as the other and we ought to be settled on this proposition by an eminent authority and I want Mr. Glover to tell us whether or not we can rely on the Babcock test.

Mr. Glover—I think I must be living on the reputation of my illustrious teacher, Governor Hoard.

That idea that goes out in regard to the Babcock test being inaccurate, being unfit to determine the value of our dairy products, is wrong. The Babcock test, while not absolute, any more than our big hay scales are absolute, is accurate enough for all practical purposes. We can measure a load of hay accurately within 4 or 5 pounds and nobody would question its correctness. The Babcock test is not absolute. Nothing is absolute except mathematics. There is a chance for the man making the test to err. All human beings make mistakes. But for all practical purposes and doing justice to the patrons as well as to the creamery man, there is no better test than the Babcock test. It does full justice to the creamery and full justice to the dairy farmer, but rogues have been working since the world started to move, and there are rogues yet living to manipulate the Babcock test, under-rating it and over-rating it as the case might warrant. I knew a large creamery concern, which I am glad to say is no longer in existence because of their methods of doing business. They would promise farmers who were taking their milk to another creamery and receiving a 3.4 test, that if they would bring their milk to them, they would receive a 3.8 test. The dairymen living on the dividing line between the two creameries would get a higher test, while the dairymen living nearer this creamery would get

a lower test than he deserved, so that a man living near that creamery who delivered them 4.4 milk would get only a 3.6 test. But that was not the fault of the Babcock test, but of the creamery man. When we test a sample of milk, if we are careful to mix it thoroughly, pouring it carefully back and forth in the bottle, then measure 17.6 c. c. and go according to the rules of the test, it will be very accurate.

For instance, your milk tests 3.6. What does that mean? In one hundred pounds of your milk there are 3.6 pounds of butterfat. Mind you now, we are reading to the third place in decimals. I may read that test and say it does not quite test 3.6, count it 3.5. We have seen recent letters from farmers where they made a great disturbance because there was a difference of one-tenth. Nobody claims that the Babcock test is absolute, that you can tell exactly by it the amount of butterfat in your milk. You know if you do not lose one-tenth of one per cent you are losing a small amount, and the next time the same man may put it up the width of a hair and you will read it 3.6 may be, a little in your favor, but in a whole year's work the amount that one could lose would be so small that he ought to be ashamed of himself to make any complaint.

We get letters right along asking "will it pay to sell 20 or 30 per cent cream?" We answer something like this, it will pay you to deliver 30 to 35 per cent cream to your creamery man. Why? Because you are paid according to the quality of your cream and not according to the quantity that you deliver. Having different creamery men weigh the sameple of cream that is being tested, is the only correct way, and all our up-to-date creameries are putting in high priced scales, so that they can weigh cream and pay you for what you send them. The creamery has no use for skim milk. Twenty per cent cream has more sugar in it than 30 per cent cream has, decomposition takes place and it becomes sour and you have been disposing of a valuable product by giving them skim milk, valuable not only for feeding purposes but for putting back fertility into your soil. It is of no use to the creamery and they will tell you so. I know of companies in northern Illinois that have offered more for cream testing 29 or 30 per cent or below that; and yet farmers that have that high testing cream will deliver larger quantities of low testing cream, thinking that they were getting larger profits, an incorrect idea. If you deliver 20 per cent cream from 100 pounds of 4 per cent milk you have delivered 20 pounds of butterfat. Twenty per cent of 100 is 20, a simple case of percentage—you have delivered 20 pounds of butterfat and 80 pounds of skim milk. Supposing you deliver 70 pounds of 30 per cent cream, you have delivered 21 pounds of butterfat, one pound more, and only 40 pounds of skim milk. You have saved yourself the expense of shipping 40 pounds of skim milk to

that creamery, the hauling of it and you get paid for one pound more of butterfat. In every case you are paid for all the butterfat you deliver, no more and no less.

The Babcock test is an accurate measure for butterfat and simply because we have men who will manipulate it, under or over-rate it in order to make it profitable, ought not to prejudice us against it. Let us get that fully.

Mr. Marple—What are the different causes for variation in the testing of cream

Mr. Glover—Sometimes because they do not turn the cream separator quite up to the required speed, or sometimes they turn it too fast. Sometimes farmers are careless and the skim milk tubes block up a little. Sometimes the milk that has the fat tests higher, which is another thing. The richer the milk, the richer the cream unless you adjust the cream screw. If you adjust that, you will make the same test from 4 per cent as you would from 3 per cent milk. It will run 3 per cent one day and 5 per cent the next, you will not get the same testing milk. I have had farmers tell me they manipulated the machine, turning it one way one day and another way the next day. (Occasionally the farmer will send in rich cream for several weeks and then purposely send in thin cream and try to bluff the test up to that formally received.)

Mr. Gurler—For three winters I worked in the dairy school work in Pennsylvania under your man Dean Waters. We had a chemist, a Mr. Field, now connected with the Oklahoma Experiment Station. He weighed the milk. I remember one winter at the close of our dairy school term Mr. Field said to me: "These tests run so close—the Gravimetric and Babcock—that I would just as leave rely on the Babcock as on the Gravimetric test for testing cream." That is authority that is reliable.

Mr. Graves—Don't you think one reason for some people suspecting the Babcock test is caused by the indifference with which they proceed to take the sample

Mr. Glover—Yes, sometimes.

Mr. Graves—It is a delicate thing if you are only dealing with a sample. Don't you think it important that you get a large sample?

Mr. Glover—Yes.

Mr. Graves—Do you not think that the temperature of the milk and water that is added should be nearly the same?

I notice that we have a great many German people that are continually doing some testing. They make tests themselves and will not believe anyone else's test.

Mr. Glover—Keep your temperatures right.

I will give you a description of how a test should be made. In making a test of milk, be sure to mix your sample thoroughly before starting. Be sure your cow is thoroughly milked. Pour the milk together immediately after milking. Take a small sample and cork it up or evaporation will take place and the milk become leathery. Then proceed with it to your laboratory. Pour it from one dish to another 3 or 4 times. Be careful not to let too much air get in the milk. Let it run down the sides of the bottle, that keeps the air out. The Babcock test is a test of weight and not measure. Take a sample of this milk with a pipet—a glass instrument 18 inches long and put this in a test bottle which has a clean neck. Keep this sample thoroughly mixed. Then we add sulphuric acid to dissolve the cheesy substance in the milk. That is whirled around in this bottle till a chemical change takes place. Then we take this bottle two-thirds full and put it into a machine and it is whirled for five minutes. The machine is 14 to 16 inches in diameter and the bottle is whirled 600 to 800 revolutions per minute exerting 30 to 40 pounds of pressure per square inch. We stop our machine and our bottles immediately take an upright position. Then we fill them to the necks with water. Then you proceed to whirl them again, if you are making a careful test. Whirl it a minute then take it again and fill to top of the graduation on the neck. The butterfat being lighter than water floats to the top. We whirl it two minutes more to be sure that no particles are sticking to the sides, keeping it at a temperature of 120 or 130 degrees. By heat it expands and by cold it contracts. Take a pair of pliars that have sharp points and place them on this bottle and read the test. If it covers half this space in the neck, it is 5 per cent.

The test is accurate, it determines the proportion of butter fat in one hundred pounds of milk. It is a simple process and can be done accurately if a man is careful.

I have gone to creameries when I was instructor in the dairy school in Minnesota and tested for one hundred patrons and I figured out within ten pounds of how much butter that would make, and that on 500 or 600 pounds of butter is very accurate. I tell you when we can do that, we have a very close test.

Mr. Mallory—Do you have any trouble with your acid? Is that standard?

Mr. Glover—You ought to have an acid with a specific gravity of 1.82. If that is uncorked for any length of time, it would take up water. Sulphuric acid has a wonderful affinity for water and it thereby becomes weakened and will affect the accuracy of the test. There will be white specks coming on top which are undissolved portions of casein; or you

will have black specks if the acid is too strong. In either case, the test is inaccurate and you should make another test using more or less acid as the case demands.

There is sometimes an inaccuracy in the glass ware and this causes an inaccuracy in the test. Sometimes the glass is not properly graduated. It is well to have your experiment man test the glassware before using it in testing. Make use of these experiment station fellows in your agricultural colleges and experiment stations. No honest creamery man will complain of being sure that his glassware is accurate, he wants to know if his scales are right. There is one thing the farmers ought to do in regard to this test, they ought to learn all about it. It would not take a day's time to find out as much about it as anyone else knows. You can go into the laboratory and see whether it is made correctly or incorrectly.

Mr. Bernays—Our city law requires that when milk falls below the standard and we go into court on the case, that we have it tested by the Gravimetric test. This test is time-consuming and expensive, and consequently to handle the large number of samples that our inspectors bring in, we make a preliminary test by the Babcock method and whenever this is below the standard, we have to repeat it by the Adams Coil Gravimetric process and we find that the results of the two methods always agree within less than one-tenth of one per cent and that really the Babcock test is the more accurate when properly conducted, because either extracts from the dried milk something more than the fat, that is, the substances which are called extractives. In the cow's milk, these extractives, not fat, are largely composed of Cholesterine.

TIME BETWEEN MILKINGS.

How much advantage is there in quantity in milking a cow three times a day over twice a day

Mr. Graves—We found that there is not so much difference in quantity as there was in quality. You can account for that in this way—and don't anyone hesitate to call me down if he wants to—cows yielding the amount of milk that these cows yield have large udders. Sometimes they are distended to the greatest extremity and they become painful. We found we relieved the cows, made them more comfortable and got better results by milking three times a day. Then too, the milk that oozes out of a full udder is the milk that contains the most butterfat. We were pretty well satisfied that we got a little more butterfat by working right hard three times a day to get it.

Mr. Patterson—I can emphasize that by saying the longer a cow

keeps her milk in the bag, the poorer it is. Miss milking one day and you will find the milk deteriorates in quality.

Mr. Graves—I am glad to be backed up by Mr. Patterson.

Mr. Gurler—Before the introduction of the Babcock test there were dairymen bringing milk to us and we had one dairyman whose night's milk had such a low test that we were sure he was watering that milk—it showed so little cream. I said to the men: "Let us be sure before we accuse this man without knowing he is guilty." I sent men out there to spy on him and we found that the milk was not watered, but that he milked his cows at four o'clock in the morning and eight o'clock at night, so that there were sixteen hours between morning and night's milking and eight hours between night and morning's. His morning's milk was all right but his night's milk was all wrong. The longer you wait between milkings, the less your per cent of butterfat.

Mr. Graves—Doubtless a great many of you are shipping milk to the creameries and perhaps possibly question the accuracy of their tests, and sometimes suspect they are possibly giving you the worst of it. A study of this butterfat sheet will take it home to you in a way that you cannot get around it.

One instance I recall from memory. One cow's milk tested 2.8 at one time and 6.8 at another time. Sometimes there is a greater variation than that.

Mr. Marple—Would a man in his morning's milk make up what he lost at night in butterfat?

Mr. Gurler—I cannot answer that question.

Mr. Graves—We found that we lost it.

Mr. Marple—That is an important question. It emphasizes the importance of milking regularly and not waiting too long a period between milkings.

Mr. Mallory—I ship cream and it has to be to the point. We had trouble along that line because we were too busy Sunday morning, did not get up quite so early and that was where our trouble came in. We finally got on to the fact that we lost that butterfat and never got it back.

REPORTS FROM MISSOURI DAIRYMEN.

[A number of reports from individual dairymen were read at the meeting but for lack of space we cannot print these reports in full. However, we glean from the reports the following excerpts containing a great deal of valuable information.]

REPORT OF S W. COLEMAN, SEDALIA, MO.

"Our place of *ten acres* is all in blue grass and it furnishes grass enough to graze thirteen head of cows and heifers, also about forty-five

head of hogs if the season is favorable. To get this amount of grazing it is very necessary to keep all stock off the pasture from the time the frost is out of the ground in February until the grass is well headed out. The pasture is well manured from the cow barn, the manure being hauled from the barn while fresh. Pure water is very essential in a dairy herd.

"From my registered herd of Jersey cows, seven in number, for the past year (part of the cows with first calf) I have made an average of 400 pounds of butter per cow, which was marketed to private families at 25 cents per pound, realizing $709.95, besides supplying the family of four with butter and cream. The skim milk was mixed with shorts and together with corn was fed to registered Poland China pigs, of which I sold to the amount of $626.75. Besides I have left the World's Fair prize winning herd of Poland Chinas under twelve months of age that was fed from this ration, and they are worth at least $300. Premiums won on this herd amounted to over $165. I have realized $150 from my Jerseys in other ways. My total receipts for the year were $1,657.50. The expense of feeding all of my stock was $819, leaving a net profit of $832.50."

REPORT OF EDMUND HOSMER, MARSHFIELD, MO.

"Some fourteen years ago when we moved upon this farm, the products of the place did not exceed $200 in a good year. We got one-third for rent and after taxes and repairs had been paid had left about $20 net, on an average, per year. Since the first of last March, less than eleven months, our sales from this farm have reached $10,106.80. When the year is up and we add to our sales the value of increased stock, the total proceeds for the year will amount to something more than $11,000. When we moved to the farm, our family physician said to a friend: 'That old man has gone to the poorest farm in Webster county to starve.' Then we thought we could see the possible farm. We still see the possible farm but our trouble in the future will be our age." (Mr. Hosmer is now 78 years old.)

REPORT OF J. W. LEE & SON, MEXICO, MO.

"We have been engaged in the dairy business for nineteen years in Mexico, Missouri. We began the business without any experience and with very little capital, but have succeeded fairly well. We keep Holstein cows, mostly thoroughbreds, a good Holstein bull from one of the best families of the breed.

"Our method of feeding is to keep our cows on pasture in summer and when they are put in the barn at milking time (4 a. m. and 7:30 p. m.) each cow is fed a small ration of mixed feed which she eats while

being milked. In winter our cows are kept in the barn except they are turned out twice a day for water and exercise. Our winter ration consists of timothy, clover and alfalfa hay, thirty pounds of silage, and fifteen pounds of mixed bran, ship and meal.

"We ship cream to St. Louis, a distance of 110 miles, and it is sold to a dairy company who bottle it and deliver it to their retail trade. We have shipped one eight-gallon can of 40 per cent cream each morning for four years, and during that time we have lost only three cans, which soured. During the summer the skim milk is fed to calves and pigs, and in winter we have a demand for it here in Mexico.

"Up to July, 1904, we also had a retail business in Mexico which required about 70 gallons a day; but the work was so great and help was so scarce that we sold our retail business with 30 cows, and now devote our time to shipping cream, which we find as profitable and much less work."

REPORT OF J. W. PLUMMER, HALE, MO.

"I have a four hundred acre farm and my son bought one hundred and thirty acres last spring which I rent. I have 46 grade Jerseys and 3 full bloods, my bull is a full blood Jersey. We are wintering 175 head of cattle and 16 horses and mules. We raise lots of hogs and fatten all of them. In 1903 we sold $1,901.63 worth of hogs, and we have the crop of 1904, 180 head on hand. We have one pasture for hogs, which we sow to rape in the spring and to rye in the fall.

"We try to take the best possible care of our cows. When the nights commence to get cold in the fall we put our cows in the barn and do not let them out at night until the grass is good in the spring. We commence to feed ensilage as soon as the grass begins to fail. We feed about 20 pounds of ensilage to each cow twice a day. We also feed wheat bran when we can buy it for $15 per ton or less. We keep hay in a rack for cows to run to during the day. We are now feeding a little shelled corn to our best cows. We have 40 winter pigs that follow the cows to pick up the waste corn. In the spring the cows are turned on the grass when it gets good. We have two pastures, one for daytime and another for night.

"I have two silos, one 16 feet in diameter and 34 feet deep, which holds 100 tons. Another is 20 feet in diameter and 34 feet deep and holds 200 tons. We commence to fill the silos as soon as the corn is fully matured. I would rather have the corn too ripe than to have it too green. We do not use anything but corn for ensilage. The corn is cut with a binder and bound in small bundles, and is hauled to the silo on low-wheeled wagons. Four wagons will haul the corn fast enough to keep

a 16-inch ensilage cutter running, provided we do not have to haul the corn too far. One man cuts bands and feeds the cutter, one man is in the silo to tramp the ensilage and one man runs the engine. We have a No. 16 Ohio ensilage cutter and cut the fodder one inch long. The blower shells off the corn and tears up the fodder and makes better feed than the old fashioned carrier and it is less trouble. We pump water to supply the engine and wet the ensilage with a gasoline engine. We have a tank of water near the cutter and keep a small stream running on the fodder as it goes through the blower. Our stock has eaten 95 per cent of the ensilage. We do not raise anything but corn, sorghum and grass and our meadows are well set to clover. We tried cow peas and alfalfa but failed with both. We feed shelled corn and bran to calves to make up for butter fat taken out of the milk.

"We ship our butter to New York City. It is all made in one pound bricks. In 1903 we made 10,667 pounds of butter from 43 cows and received a net price of 22 cents per pound. In 1904 we made, from 46 cows, 11,572 pounds of butter for which we received a net price of 21 cents per pound."

REPORT OF H. C. GOODRICH, CALHOUN, MO.

'I send you herewith my figures representing my operations in dairying for the last year:

FEED FED COWS DURING YEAR.

Bran worth	$426 05
Corn worth	54 00
Ensilage worth	100 00
Hay and fodder	276 72
Soy beans, straw and all	25 00
Pasture	105 00
Total for 32 cows	$986 77
Per cow	30 83

HERD RECORD FOR 1902.

Number of cows kept	32
Butter actually churned lbs. per cow	331
Cream and milk used in family amounting to lbs. butter per cow.	7
Total lbs. butter per cow	338
Net price per 100 pounds, after deducting all expenses for packages and marketing	$23 80

Amount received for butter per cow........................	80 44
Cost of feed per cow...	30 83
Making of butter at 3 cents per lb..........................	10 14
Fifteen per cent on money invested in cows to pay interest, insurance and to keep up herd per cow..................	7 50
The calves, skim milk and manure will pay for taking care of herd, feeding and milking.	
Total expenses per cow..................................	$48 47
Leaving net profit per cow after all expenses are paid..........	31 97

DISCUSSION BY MR. GURLER.

I want to say that from the examples given in these reports I judge that there is bacteria enough in Misouri to inoculate the whole State with dairying. Mr. Goodrich gives here a business like report. It cost him $30.83 per cow to feed his herd and from these 33 cows he made an average of 331 pounds of butter per head, the cream and milk used in the family amounting to 7 pounds per cow or a total average of 338 pounds per head. Now the net price received for the butter was 23.8 cents per pound, making the total amount received for each cow $80.44, making a net profit, according to the above statement of $31.97 per head.

This statement is entirely fair except the last item. Mr. Goodrich has been unfair to himself and to his cows. The calves, the skim milk and the manure will more than pay for taking care of the cows. Twelve dollars per head will pay for that labor. It has done it for me in years past, that is before I was putting so much labor into my work. Now the calf certainly ought to be worth $2.50 when it is dropped. The skim milk should be worth $10 per head. A fair estimate for the value of the manure is $1.50 per ton for five tons per year for each animal, making the manure worth $7.50 per head. Considering these items, Mr. Goodrich gets right up to $40 net money per head, for the 32 cows, nearly $1,300. This will show that some of your farmers are doing business.

I hope you will take this home with you and think about it and realize that there is more room for improvement in dairying than in any other line of business in this country.

Miscellaneous.

MISSOURI CHESTER WHITES.

The Missouri Chester Whites and the Missouri O. I. C.'s made a fine showing for the State at the St. Louis World's Fair. The Louisiana Purchase Exposition management placed all Chesters in open competition that were recorded in any of the four reputable Chester records, namely, the O. I. C., the National, the Standard and the American. Four patrons of the O. I. C. record exhibited 70 head of stock, and one patron of the National record exhibited 14 head. The O. I. C. record offered $710 in special prizes, of which the Missouri breeders won about $500. This speaks for itself in saying that Missouri is long on O. I. C.'s. The National record offered $900 in special premiums, but these were confined to duplicating first prizes won in the open ring, and none of these were awarded because their patrons failed to secure any first prizes, although Missouri Nationals considerably outranked those from other states.

For lack of space we omit mention of the special premiums awarded, but on another page may be found the prizes awarded by the World's Fair, and also the prizes awarded by the State of Missouri.

Of the Missouri exhibitors Judge L. L. Frost, Mirable; Dr. O. L. Kerr, ndependence; Nunnelly Bros., Readsville, and C. M. Kerr, Independence, are patrons of the O. I. C. record, while Mr. W. W. Waltmire, Raymore, is a patron of the National Chester White record. The special prizes offered were of great assistance in getting out a good exhibit.

From the three sets of prizes offered Judge Frost secured 71 ribbons and $3,107.00 in cash, being a greater number of ribbons and more money than was awarded any other Chester breeder in the world; while Dr. Kerr was a close second. We present herewith cuts of a pair of Chester Whites of special merit: Jackson Chief No. 4759, was farrowed May 10, 1901, was bred by Judge L. L. Frost, Mirable, Missouri and sold to M. L. Frost, Jackson Minnesota, when four months old. He is prob-

ably the greatest Chester White Boar ever produced counting constitutional vigor and show ring qualities to be the standard of excellence. The accompaning cut of this grand boar was made from a photograph taken by Risk just as he was awarded the Grand Championship prize. Judge Frost bought this hog back in January, 1904. His record in the show ring while owned in Minnesota is as follows: As a pig in 1901 he won first and sweepstakes over all breeds at the Jackson County, Minnesota Fair. In 1902 and 1903 he won the same premiums at the same fair, while in 1904 he was again in Missouri and shown at the World's Fair, where he won seven first prizes amounting to $758. He is a never beaten Grand Champion Chester White of the world, and the same in the O. I. C. ring.

Tutesy No. 8913, shown on another page, was farrowed September 3, 1902, and is from a litter of fourteen pigs. She was bred and is owned, by Judge Frost. She was shown as a senior pig at the American Royal in 1903 where she won first and championship prizes. Late in the spring of 1944 she farrowed a litter of nineteen pigs, one of which (Royal Dick No. 11,113) won 6th in the open ring, 1st O. I. C. and first Missouri special.

FEEDING HOLSTEIN DAIRY COWS AT THE WORLD'S FAIR.

(W. A. Cochel, Student Agricultural College.)

After the Holstein-Friesian Association had declined to participate in the dairy demonstration at the World's Fair, three Missouri breeders, Mr. M. E. Moore of Cameron, Mr. R. W. McGuire of St. Louis and Dr. Geo. C. Mosher of Kansas City formed a company so that their favorite breed would be represented. They selected a feeder of National reputation to take charge of their cows, but this man proved to be unsatisfactory and was discharged on July 14th. The cows had made an average record of sixty-one pounds of milk per head daily during the first ten days of the test, but had fallen to forty-two and eight-tenth pounds on July 15th, when the writer took charge of them. At that time three of the fifteen cows were "off feed" and of the remaining twelve over half did not eat their feed with a relish. At the end of the test, ninety days later they were giving fifty-one pounds per head daily.

System of Feeding.—Having made no provision for silage, the feeder was forced to rely very largely upon soiling crops which, owing to the unfavorable season, were not always of the best quality. Throughout July green corn was used which had not yet come out in tassel, hence

was very immature and carried a very high percentage of water. The corn was cut into lengths of three to four inches. In addition to green feed, alfalfa hay and grain were used. The grains fed consisted of Union Distiller's grains, corn meal, hominy feed, corn hearts, bran, oil meal, cotton seed meal and gluten feed so mixed as to form a nutritive ration of 1:4.5 or 1:5.

The cows were given their first feed at 4 a. m., which consisted of grain followed by green feed. Then they were led out for exercise, after which they were given all the hay they would eat up clean until nine o'clock. Nothing further was fed until 11:30 a. m., when they were given grain followed by another green feed. Nothing more was fed until 6 p. m., when they received their third feed of grain followed by green feed. Then they were given what hay they would clean up during the night. Water was kept before them at all times. Salt was given in the grain feed to the amount of two to three ounces per day. The grain was mixed thoroughly with cut alfalfa hay before feeding so as to give it more bulk and to force the cows to masticate it properly. One cow was withdrawn from the test for seven days on account of sickness. With this one exception no medicine, stimulants or condiments whatever were given.

The average ration was about as follows: 19 pounds of grain, 50 pounds of green feed and ten pounds of dry hay per head per day. This ration varied from day to day, governed by the appetite and condition of the cow.

Cows No. 6, 7, 8, 9 and 10 were entered in the dual purpose test, hence were fed more heavily than they would have been for an economical production of milk. In the dual purpose test cows were given credit for the increase in live weight. Cows No. 7, 8, 10, 14 and 19 were tested in May for entry in the advanced register. The extremely heavy feeding, from 25 to 30 pounds of grain per day, no doubt acted as a handicap on them during the long test.

Selection of the Cows—These cows were selected, as nearly all cows are when bought for practical dairy work, that is, by outward appearances. The larger part of them had never been tested, hence the outcome was uncertain. It is a notable fact that the best two cows came from a herd which has been bred up and improved by the use of the scales and the Babcock test. In addition to this they have also been on the show circuit for many years, always winning a goodly portion of the ribbons.

TABLE GIVING THE RECORD OF 15 HOLSTEINS IN THE DAIRY DEMONSTRATION, SHOWING THE ECONOMIC PRODUCTION OF BUTTER FAT.

No.	Name.	Total number lbs. of milk.	Total lbs. fat.	Per cent. fat.	Total number lbs. solids not fat.	Per cent. solids not fat.	Estimated lbs. butter.	Total value of product.	Cost of feed.	Net profit.
6	Jolie 4th's Pauline DeKol	6174.5	213.752	3.5	475.039	7.7	249.876	$78.377	$32.798	$45.57
7	Dorenda DeKol	5659.0	180.965	3.2	433.738	7.7	210.824	67.302	34.675	32.627
8	Jollie Johanna	6630.6	221.649	3.3	545.451	8.2	258.664	82.859	34.516	48.343
9	Daisy Lamb Pietertje	6040.0	188.526	3.1	460.752	7.6	219.444	70.381	32.662	37.719
10	Joe Bach Josephine	6236.4	198.586	3.2	527.160	8.5	231.353	75.391	34.539	40.852
11	Bessie Nayne's Champion,	6522.9	215.634	3.3	550.934	8.4	251.203	81.218	34.700	46.518
12	Maplecroft's DeKol Perfection	6405.1	245.303	3.8	503.240	7.9	287.495	88.688	34.165	54.523
13	Sady Truth Gerben Mechthilde	6929.4	254.605	3.7	528.885	7.6	298.142	92.249	35.232	57.017
14	Heeringa's Pauline 2nd	6311.8	197.950	3.1	477.420	7.6	230.414	73.708	33.571	40.137
15	Hadria 2nd	6792.3	239.617	3.5	566.272	8.3	280.112	88.873	35.619	53.254
16	Mary of Glencoe	5671.8	200.281	3.5	441.794	7.8	234.128	73.338	33.416	39.922
17	Anzoletta DeKol	6607.9	222.443	3.4	514.406	7.8	259.813	82.165	34.817	47.348
18	DeKol DeYong	6233.2	227.101	3.6	507.440	8.1	265.703	83.353	34.414	48.889
19	Sallie Clothilde	5853.3	209.422	3.6	477.848	8.2	245.024	77.162	33.956	43.206
20	Shady Brook Gerben	8101.7	282.601	3.5	620.534	7.7	330.361	103.396	36.573	66.823

A careful study of the above table will show that the dual purpose cows yielded an average of 6,148.1 pounds of milk, testing 200.66 pounds of butter fat and 488.24 pounds of solids not fat. The special dairy cows yielded an average of 6,542.9 pounds of milk, testing 229.49 pounds of butter fat and 512.38 pounds of solids not fat. The difference in profit in 120 days was $8.95 in favor of the special dairy cows. The profit from the best cow during the test was $66.82. The profit from the poorest cow during the test was $32, a difference of $32.82, while the difference in cost of feed consumed was only $1.90. In other words, the profit on one cow was more than twice as much as on the other with identical care. Another fact brought out by the above table is that the best four cows which consumed the greatest quantity of feed also returned the greatest profit. The important lesson from this demonstration is the value of individual merit which is based very largely on the capacity of the cow, her disposition, her mammary system and her general constitution.

The best cow in the test was Shadybrook Gerben No. 20. As will be seen from the table, she produced 8,101.7 pounds of milk or an average of 8.4 gallons per day testing 282.60 pounds of butter fat, equivalent to 330.38 pounds of butter, or an average of 2 3-4 pounds of butter per day. This cow has quite a remarkable record as she is twelve years old and has traveled all over the United States as a show animal. She has never been defeated in the show ring, nor has she met in her long career a cow which could produce as much butter fat in the same length of time. She is almost black, having very few white spots upon her, is rather short-legged, very deep bodied, with large barrel, large and torturous milk viens, a large well-balanced udder, good teats and has most excellent handling qualities. She has an ideal disposition, is kind and quiet, yet ever alert and active. She is a most excellent feeder, not ravenous but always ready to eat. During the test she never refused a meal and would become impatient when the feeder began his work. She is of the kind that makes men love cows.

Another cow worthy of notice is Jollie Johanna No. 8. She was bred in New York, but bought for the St. Louis demonstration. She was also a short-legged, deep-barreled cow, almost white in color, with a very deep body, excellent milk viens and nearly an ideal udder. She was entered in the show ring at the World's Fair and awarded the Grand Championship prize for females. This is quite remarkable when it is considered that she had been in the test for ninety days when she appeared before the judges and the award was made. She was also entered in the dual purpose test where she stood first in dairy performance and

second when the beef qualities of the cow and calf and dairy performance were all considered.

The herd bull Sarcastic Lad was bred by the Michigan Agricultural College and had proved himself one of the best sires in the United States. He is a typical dairy bull, weighing 2,200 pounds, has the active, aggressive dairy temperament, walks as if he owned the earth, but is easily handled. He was entered in the show ring where he was awarded the Grand Championship prize against very warm competition. He is very deep-bodied, has large capacious barrel, excellent handling qualities, long, level rump and is cut up in the twist very high. His shoulders are masculine, his neck well-crested, withers thin and brisket rather low. His front legs are set rather too close together.

Taking the results as a whole, they were very satisfactory. When the conditions which the three breeders had to meet were considered and just honor is due Missouri for producing the phenomenal cow Shady Brook Gerben.

THE SUPERVISION OF THE COW DEMONSTRATION AND SOME OF THE LSSONS TAUGHT.

(C. H. Hechler, Student of the Agricultural College.)

It may be of interest to those who have been reading the records made during the dairy demonstration at the Louisiana Purchase Exposition to know how the observations were made and how the records were kept. Upon the accuracy of these must, of course, depend the value of the results obtained. This was a phase of the demonstration that could not be delegated to the representatives of the different breeds. The work had to be done by someone who had nothing to lose or win by the outcome of the test. The management of the Exposition, upon the request of the various breed associations represented, placed the matter of supervision under a committee of the Association of Experiment Stations. Of this committee Prof. E. H. Farrington, Dairy Husbandman of the Wisconsin Experiment Station, personally managed the supervision.

The detail work was done by a force of from nine to twelve men, instructors and advanced students from various agricultural colleges. Among these were four from the Missouri Agricultural College.

As visitors at the Exposition will remember, the cows were quartered in three octagonal barns, the Shorthorns and Jerseys each occupying a barn, while the Holsteins and Brown Swiss were in the same barn. In each of these barns were stationed two of the supervising force, known

as "checkers." It was the fortune of the writer to serve on the supervising force as one of these "checkers" throughout the demonstration. At irregular intervals the men were transferred from barn to barn. Our work, in short, consisted in seeing that the rules laid down by the Supervising Committee were carried out and that the work in the barns was done accordingly. This included the weighing of all the feed, fed to the individual cows as well as the weighing and sampling of their milk. Whenever a weight was made it was at once carefully recorded with a carbon copy, on blanks especially provided for the purpose. The work of feeding and milking in the several barns was done according to a strictly observed schedule prescribed by the Supervising Committee. The day's work began at four o'clock. At this time the cows in two of the barns were fed. The daily ration of each cow was kept in an individual feed box of convenient size to hold a day's allowance of grain and cut hay. Each cow in the demonstration had a barn number and in all the work was referred to by it. This was painted on her stall and on her feed box, as well as stamped on a brass tag attached to her horns or suspended about her neck. The hay was kept in a numbered, securely sealed bag. The first work in the morning of the "checker" was to unlock each box and break the seal of the corresponding bag. Then he must see that the feed was given to the right cow. As soon as the animal was fed, her box had to be re-locked and the hay bag re-sealed. This process was repeated at 11:30 a. m. and 6:00 p. m. The ration for the entire day was mixed and the ingredients weighed into the feed box under the eye of one of the "checkers." It was the duty of the "checker" to record the weight of each of the ingredients of the feed and turn these in at the central office. No feed could be cut without the presence of one of the "checkers," to see that nothing went into the feed but what was charged to the cows. All feed and forage were kept in locked bins. At regular intervals small samples of each of the feeds used in the barns were placed in properly labeled bottles. These were sent to the Bureau of Chemistry, United States Department of Agriculture, Washington, D. C., where a chemical analysis was made. The subjoined table gives the analysis of the various feeds used during the first half of the demonstration.

TABLE I.

Analyses of feeds used in Dairy Demonstration June 16–July 8.—Bureau of Chemistry, Washington, D. C.

Feed.	Water	Ether extract	Ash	Albumenoids	Crude fiber	Nitrogen free extract
Bran—						
Jersey	13.04	4.07	6.17	14.76	9.76	52.20
Shorthorn	12.86	5.32	6.44	14.07	9.26	52.05
Brown Swiss	16.59	2.83	6.47	13.41	11.48	49.22
Hominy Feed—						
Shorthorn	9.25	8.02	2.77	10.23	4.48	65.25
Brown Swiss	10.16	9.10	3.67	9.86	5.04	62.17
Ground Oats—						
Holstein	15.48	3.58	3.86	10.54	12.79	53.75
Shorthorn	14.44	4.79	3.89	9.53	10.12	57.23
Corn Hearts—						
Holstein	10.68	11.68	3.73	11.45	14.60	47.86
Jersey	9.59	8.57	1.85	21.62	9.59	48.78
Shorthorn	10.76	9.02	2.01	21.41	9.84	46.96
Gluten Feed—						
Brown Swiss	10.08	4.41	2.16	20.79	6.94	55.62
Jersey	10.54	4.42	2.00	23.69	8.73	50.62
Holstein	9.91	4.55	2.24	20.18	7.07	56.05
Shorthorn	9.71	3.20	1.86	25.62	6.19	53.42
Distillers Grains—						
Jersey	8.52	12.37	1.75	27.19	12.86	37.29
Union Grains—						
Holstein	10.84	7.80	3.98	26.23	10.61	40.54
Malt Sprouts—						
Brown Swiss	16.02	.95	8.26	20.29	12.51	41.97
Corn Meal—						
Jersey	13.91	1.89	1.05	7.57	1.31	74.27
Oil Meal—						
Shorthorn	10.37	7.77	5.32	34.89	7.45	34.20
Holstein	11.69	8.64	5.64	32.00	7.37	34.66
Jersey	12.55	6.62	5.25	33.49	7.88	34.21
Brown Swiss	11.94	6.19	5.63	32.68	7.91	35.65
Cotton Seed Meal—						
Brown Swiss	10.18	8.14	6.77	37.43	7.73	29.75
Shorthorn	9.81	9.49	6.69	40.82	7.29	25.90
Jersey	9.34	9.38	5.62	42.10	8.25	25.31

An inspection will show wide variations in the feeding value of the feeds placed on the market under the same name. It must in this connection be remembered that the analyses were made of composite samples and represent the average composition of the feed for the respective herds for a period of sixty days. Of course high values would counteract low ones. No doubt if we had the figures for the different lots of feed bought from time to time, much greater variations would be noticeable.

Let us examine some of the common feeds, as cotton seed meal. Protein is the feed which the dairyman desires to purchase when he buys such a concentrate as cotton seed meal. For our purpose, the term albumenoids in the table is equivalent to protein. We find the cotton seed

meal fed to the Brown Swiss herd contained 37.4 per cent albumenoids and that fed the Jerseys 42.1 per cent, or a difference of 4.7. In other words, on an average, one lot of cotton seed meal contained an eighth more albumenoids than the other. On the other hand, we find that the Jersey cotton seed meal contained only 25.3 per cent nitrogen free extract or carbo-hydrates, while that fed the Brown Swiss ran to 29.75 per cent, or a difference of 4.44 per cent or more than one-sixth more fat and energy-forming food. A comparison of the corresponding figures for the gluten feed shows that the gluten feed fed to Shorthorns contained approximately one-fourth more of albumenoids and one-fifteenth less nitrogen free extract than that fed to the Holsteins. It might be added, however, that the former was also lower in ether extract or fat. We shall call attention to one other such a difference. In the case of "corn hearts," we find the most marked discrepancy, the per cent of albumenoids in that fed to one herd being only half of that fed to the other two herds. None of the feeds used contained any mysterious principle. They were all common feeds, available to any feeder. We find that the bran used was lower in feeding value than our standard figures, as reported by the United States Department of Agriculture, and the ground oats did not nearly come up to the average standard. If this is true of our two commonest feeds when bought for demonstration purposes, there is perhaps much ground for the charge often made that dairy feeds often fall below the standard in nutriment.

At four o'clock milking began. In each barn there were from three to five milkers. To aid in proper supervision, the cows were arranged in a semi-circle about a central elevated platform from which a good view of the barn could be obtained. Here the milk was received by one of the "checkers" while the other saw that the milk buckets were empty when a milker began to milk a cow, and that the milking was properly done. When a milker had finished milking a cow, he brought the milk on to the platform where it was poured into a sample bucket, which was of uniform diameter, and weighed on a spring balance. After recording the weight, a sample was taken by means of a "milk-thief" or tube of uniform diameter. To secure enough milk to make a lactometer reading, and at the same time avoid dipping more than once, the ordinary commercial "milk-thief" was discarded for one of greater diameter. The uniform shape of the sample bucket and "milk-thief" insured an accurate sample. Samples of morning, noon and evening milk from each cow were placed together in pint sample jars. Each jar was tagged with the barn number of the cow. These jars were locked in a compartment case, and once each day were sent to the laboratories to be tested. The samples

were kept sweet by placing in each jar about half a gram of potassium dichromate.

In the laboratory, which was located at the Model Dairy in the Agricultural building, two tests were made of all the samples, the percentage of fat being determined by means of the Babcock test and the other solids by means of a lactometer reading. All tests were performed in duplicate; each set being conducted independently by two chemists. From the laboratory, the per cent readings of fat and solids not fat were sent to the offices. Multiplying these by the total milk yield in pounds for the corresponding day gave the production of each member of the herds. Unlike the test at Chicago, butter was not churned during this demonstration, all calculations being based on the amount of butter fat and estimated butter, making allowance for over-run and loss in skimming and churning. The assumed over-run was seventeen per cent, or one hundred pounds of butter were allowed for every eighty-three pounds of butter fat. The loss due to skimming and churning was placed on a graduated basis, more being deducted for poor milk than rich milk.

Awards were made in three classes:

Class A.—"For the demonstration of the economic production of butter fat and butter." The estimated butter was valued at 25 cents per pound. This class was entered by 25 Jerseys, 15 Holsteins and 5 Brown Swiss.

Class B.—"For the demonstration of the economic production of milk for all purposes." The butter fat was valued at 30 cents per pound and solids not fat at 3 cents per pound. This test was entered by 25 Jerseys, 25 Shorthorns, 15 Holsteins and 5 Brown Swiss.

Class C.—"For demonstration of all products of the cow." In this test 40 per cent was allowed for dairy products, 35 per cent for the meat making indications of the cows, and 25 per cent for the calves, judged on the beef basis. The products were valued as follows: Butter fat 30 cents per pound, solids not fat 3 cents per pound and gain or loss in live weight of cows 4 cents per pound. This test was entered by 25 Shorthorns, 5 Holsteins and 5 Brown Swiss.

Awards in classes A and B, were made in the following manner: Each cow was credited with the dairy products that the books showed that she had given, according to the values given above. From this was deducted the value of her feed according to the appended table. The difference gave the net profit due her, and the size of the net profit determined her comparative standing in her class.

TABLE II.

All feeds were charged to the individual cows according to the following tables of values.

Feed.	Price per ton.	
	First Sixty days.	Second sixty days.
Alfalfa hay	$6 50	$7 50
Clover hay	6 00	7 00
Corn silage	2 00	2 50
Green cut clover	3 00	3 00
Green cut corn	2 00	2 50
Green oats and peas	2 50	3 50
Corn meal	15 00	20 00
Bran	15 00	18 00
Hominy feed	12 50	18 00
Oil meal	24 00	24 00
Cotton seed meal	25 00	26 00
Ground oats	22 00	20 00
Rolled oats	36 00	36 00
Gluten feed	16 00	20 00
Distillers grains	24 00	
Union grains	17 00	20 00
Wheat middlings		19 00
Malt sprouts	10 00	18 00
Corn hearts for Shorthorns and Jerseys	16 00	20 00
Corn hearts for Holsteins	12 50	18 00

The table of values for the first sixty days was established before the beginning of the demonstration by the representatives of the various breeds. Before the beginning of the second sixty days the supervising committee decided that the values found in the second half of the table were more nearly an average of the market values for all parts of the country. Throughout the whole test the feeders were permitted to feed whatever feed thy desired in such quantities as in their judgment would produce the most economical results.

The two "checkers" were assisted in their work by the Jefferson Guards, three shifts of these being on duty during the twenty-four hours. They were under strict orders not to leave the barn or permit the cows to be fed except at the prescribed time. They also saw that strangers did not enter the stalls of the cows.

The question that naturally presents itself to our minds is, "what are the practical lessons to be learned from the test?" The first is, use good cows. No other kind will, at any price of feed, net the best returns. It is a trite saying but no less true that this kind of a cow requires little more actual work in her care than one which is being kept at an actual loss. True, the cows in the demonstration were selected individuals, but a large proportion of them came from small working herds. Although Missouri does not boast of being a strictly dairy State, it is worthy to note that seven cows came from Missouri herds and it is not

unfair to assume that there were others among the herds of the State which, had they freshened at the right time, would have done equally as well. If these could be produced and developed on Missouri soil, others equally as good can be.

Of course many of the details of the work, as done in the test, are not applicable to practical dairying, but the principles hold good, and many of the methods are the same that have been used to build up successful herds. The only way that a man can build up a herd in production is to know what his cows are doing. The only way to determine whether a cow is yielding a profit or not is to know how much her keep costs and what her product is worth. The scales played an important part in obtaining this information. The cow's feed should be weighed at intervals to furnish a fairly accurate estimate of the amount of feed which she consumes; but more important is the weighing of the milk. Do not trust your judgment. Of all the milkers in the test, some of whom have had twenty years' experience in the milking and weighing of milk, not one could guess the yield of a cow at a milking to a pound. This may seem close, but the doubtful pound is the one that counts. Particularly is the total yield for any period of value to the feeder in compounding the ration. A slump of a few pounds is a warning to him that the machine is not running smoothly. Perhaps the limit of the cow's capacity has been reached, or if she has been steadily on the same combination of feeds, he is warned that she is tiring of them, and that her system demands a change. On the other hand, the effect of a gradual addition of any feed can best be determined by the resulting milk flow. It is impossible to remember the small amounts by which each of a large number of cows in the herd varies from day to day, and finally the record becomes of particular value when it extends over a long period of years, forming, as it does, a basis for breeding operations.

The Babcock test is, of course, the most convenient way to determine the yield of butter. Of course the test need only be made at regular intervals, as once a week, or even once a month. To show that these methods are practicable we need only mention the fact that four of the Missouri herds represented in the demonstration have been built up by judicious use of the scales and the Babcock test. It is also of interest to note that three of these herds have been successful in the leading show yards of the country during the past decade. From this it appears that high production is by no means absent in prize-winning herds.

The greatest lesson for the dairyman taught by this test is that he must study his cows not as a breed, or as a herd, but as individuals. No breed has the monopoly on all good cows. When one cow makes 330

pounds of butter in 120 days and another only 143 pounds, it is apparent that individuality counts even in selected herds.

During the 120 days the best cow gave a net profit of $67.75, while the poorest cow gave a profit of only $21.85. It is apparent that if one would receive the maximum profits, he must work with the individual cow as a unit.

AGRICULTURE AND LIVE STOCK STATISTICS.

CROP REVIEW, 1904.

The crop season of 1904 was one of the most unfavorable in the history of the State. During the greater part of the season for planting and cultivating the crops, the weather was cold, and there was a great excess of rainfall which prevented cultivation and growth, and we consider it remarkable that we have produced as much as we have under these unfavorable conditions. The wet season prevented planting a full acreage of spring crops, and the total acreage under cultivation for 1904 was considerably below the average.

CORN.

Corn is the great staple in Missouri, usually representing a value greater than all other farm crops combined. This year the corn crop is estimated to be worth $73,476,280, which is approximately 48 per cent of the total value of all farm crops. The acreage was reduced for the present year 6 per cent. In a few counties in the extreme southeastern and northeastern sections a good yield of corn was produced, but in all other portions of the State the yield was below the average. All flat, wet lands suffered from the excessive rains and only on well drained or sandy soils was there anything like good crops. The poorest yields by counties was in the western portion of the State, and in that section including Jackson, Pettis, Johnson, Cass, Henry, Bates, Vernon, and St. Clair counties. Much of the crop was planted very late but the fall was very favorable and practically all the crop matured without damage from frost.

Where the World's Corn Crop Grows.—The United States produces upon an average approximately 75 per cent of the total corn crop of the world. Of the remaining one-fourth, Europe produces about three-fourths or about 19 per cent of the world's crop. A small amount of corn is raised in Mexico and a very little in Africa, Canada and Australia.

The five-year average for the world is approximately 2,700,000,000

bushels. The five-year average for the United States is approximately 2,031,000,000 bushels.

These five states, viz.: Illinois, Iowa, Missouri, Kansas and Nebraska, produce on an average 39 per cent of the corn crop of the world and 51 per cent of the corn produced in the United States.

Where Missouri Ranks.—For the same five-years period, 1899-1903, inclusive, the State of Missouri has produced 6 per cent of the total world's corn crop, 8 per cent of the total crop of the United States and 16 per cent of the total produced by the five corn states named.

Missouri's Yield is High.—The following table compiled from the Year Book, Department of Agriculture, for the years 1902, 1903 and 1904 shows that Missouri outranks, in yield per acre, all the great corn states except Illinois. Missouri produced for the three years named, an average yield of five bushels more per acre than Kansas; 2.2 bushels more than Nebraska; 1.7 bushels more than Iowa. If the corn acreage of the mineral belt of Missouri could be eliminated and only the corn belt of the State considered, this State would take first rank.

CORN YIELD PER ACRE.

From Year Book Department of Agriculture.

State.	1902	1903	1904.	Average for 3 years
Illinois	38.7	32.2	36.5	35.8
Iowa	32.	28.	32.6	30.8
MISSOURI	39.	32.4	26.2	32.5
Nebraska	32.3	26.	32.8	30.3
Kansas	29.9	25.6	20.9	25.5
Whole United States	26.8	25.5	26.8	26.3

Can You See These Figures?—Missouri produced in 1902 an average of 39 bushels of corn per acre for the whole State, a higher yield than any of the corn states for any year of the period mentioned.

Missouri's Acreage Too Low.—The total corn acreage of the State in the above comparison is taken from the Year Book of the Department of Agriculture. The report of the State Board of Agriculture shows a much larger acreage. From the Year Book of the Department of Agriculture 1896, page 559, we find that Missouri is credited for that year with a corn arcreage of 6,546,987, while in 1904, eight years later the State is credited with only 5,783,307 acres, a decrease of 763,680 acres. or nearly 12 per cent, notwithstanding that during that period there has

been a considerable acreage of timbered lands in the State put into cultivation, and in the southeast part of the State a large acreage of swamp lands has been drained and is now in cultivation, most of it in corn. The acreage for the crop of 1904, as estimated by the State Board of Agriculture was 6,646,790 acres, which is more than 14 per cent above the Government estimate. Compared with the Government estimate for the year 1896, however, the acreage, as estimated by the Board of Agriculture, is only about one and one-half per cent greater, which is a very small increase for the eight years.

HAY AND FORAGE.

The crop second in importance based on value, is hay and forage. The most important hay grass is timothy. Farmers generally have grown timothy mixed with red clover and the clover greatly increases the feeding value of the hay. Under hay and forage is included timothy, red top, clover, alfalfa, sorghum when raised for forage, millet, cowpeas, etc. The total acreage in hay and forage was 3,335,780 acres and the total product was 5,177,650 tons, valued at $32,958,175.

WHEAT.

The wheat crop made an excellent showing and promised much more than an average yield until a few days before harvest, when on account of wet weather many fields were badily infested with rust or blight, and the final yield for the State was very unsatisfactory and the quality generally poor, only a small per cent of the crop was good enough to grade number two. The yield in some fields would be good with good quality, while in adjoining fields the crop would be almost ruined with the rust. The average yield per acre for the 2,444,760 acres harvested was 11.1 bushels, which is 2.5 bushels per acre more than the average yield for 1903.

The estimated acreage seeded for the crop of 1905 is 2,383,280, which is about 7 per cent less than the crop seeded the year before, but it is less than 3 per cent below the acreage that was harvested in 1904. The crop has suffered from drouth to the greatest extent in the southwestern section. There has probably never been a season when good preparation of the soil showed to a greater extent than it does this year. Where the land was thoroughly prepared and the wheat sown reasonably early, the crop does not show much damage, although it has not made much top growth. The average condition for the State on December 1st was only 73, which is twelve points below the average condition one year previous.

Grand Champion Jack, "Orphan Boy," 696, bred and owned by L. M. Monsees & Sons, Smithton, Missouri, the most successful breeders of jack stock in the world. They won 70 premiums at St. Louis, 1904.

Where the World's Wheat Crop Grows.—An average wheat crop of the world, taking the five-year period, 1899-1903 as a basis, is approximately 2,927,000,000 bushels. This makes the total wheat crop of the world 227,000,000 bushels more than the corn crop for the same period. Of this grand total of the wheat crop, the United States produced an average annual yield of 625,000,000 bushels, or approximately 21.5 per cent. Missouri for the same five years, taking the estimates of the United States Department of Agriculture, produced approximately 4½ per cent of the total crop of the United States, or about one per cent of the total crop of the world.

The following table gives the average annual wheat crop of the leading wheat producing countries of the world, together with time of harvesting, for the five-year period 1899-1903:

Country.	Time of harvest.	Average annual yield bushels.
United States	June, July	625,000,000
All Russia	Northern, October Southern, July	541,497,000
France	July	338,975,000
British India	February	249,095,000
Italy	June	151,380,000
Hungaria	July	147,853,000
Germany	August	129,653,000
Spain	June	105,606,000
All South America	Nov., Dec., Jan	105,594,000
All Africa	North, Mar., May South, November	45,915,000
Australasia	January	45,459,000

Missouri's Wheat Belt.—Most of the counties bordering on the Mississippi and Missouri rivers grow considerable areas of wheat. A group of counties including Jasper, Newton, Greene, Dade, Barry and Christian, all in the extreme southwestern part of the State, grow a large acreage of wheat. Johnson county also has a large acreage. Lawrence county, in the southwest, grows a larger acreage of wheat per square miles than any county in the State, and St. Charles county, in the eastern part of the State, is second in the acreage per square mile.

OATS.

Only a few counties in the State grow more oats than are used at home. As a rule oats are not a paying crop in Missouri on account of the damage caused by rust. The crop is raised to get in the necessary rotation and because oats are excellent for balancing up other rations.

The crop this year was damaged from the same causes that damaged the wheat crop. The acreage harvested this year was only 694,190 and the average yield for the State 21.7 bushels per acre compared with an acreage of 755,800 and an average yield of 23.5 bushels per acre in 1903.

FLAX.

The cultivation of flax in Missouri was largely brought about to get a crop that could not be damaged by chinch bugs. The acreage sown to flax for the last few years has been greatly reduced, and it has not generally been a profitable one. Most of the flax is raised in a few of the western counties, Bates and Vernon being the largest producers in the State. The total acreage for the State has fallen to 24,790, and the total yield for this year is estimated at only 144,855 bushels.

COTTON.

That the quality of the cotton grown in Missouri is of the very best is proved by the fact that the only bale of Missouri cotton exhibited at the World's Fair at St. Louis received a grand prize for its high standard of excellence. The exhibit was made by Mr. W. N. Burns of Gibson, Dunklin county.

The State produced in 1904 on 74,988 acres a total yield of 24,451,690 pounds of lint cotton, valued at $2,272,660. Dunklin county produced 60 per cent of the total for the State. It may not be generally known, but it is true, nevertheless, that in quality and length of fiber and average yield per acre, southeast Missouri excels the other states of the Union.

For more detailed information concerning the acreage, yield and value of the crops produced in 1904 reference is made to the following pages giving statistics by counties.

THE FRUIT CROP, 1904.

(L. A. Goodman, Secretary Missouri State Horticultural Society.)

The fruit crop of the State of Missouri for the year 1904 was a light one. Owing to the late frosts and the cold east rains during the blooming time of the apple and peach, these crops were cut very short. The injury to the strawberry crop was very light and this crop turned out to be a full one. All the strawberry districts of South Missouri, about Neosho, Peirce City, Marionville, Sarcoxie, in Howell and Greene

counties, through Webster, Wright and Texas counties, we find that the crop was a full one and taxed the refrigerator car lines to their utmost to handle them in season. About 1,500 car loads of strawberries were sent from these districts during the summer, each car containing 600 crates of 24 boxes each.

Strawberry growing is getting to be one of the great industries of our State, and Southwest Missouri is now known all over the United States as one of the largest, if not the largest district for the growing of strawberries. The crop of the State will bring, and does bring, two and one-half million dollars each year. The largest acreage in strawberry fields is to be found in Missouri, and this is the third in the list of fruits, apples coming first and peaches next.

The apple acreage has grown more rapidly than that of any other State since the Government Report of 1900 was made, showing Missouri with over twenty million trees, five million more than any other State. Since that time the increase has been more rapid than ever and today we have twenty-four million apple trees in orchards. While New York is far ahead of us in value of orchard products at the present time, yet when all the orchards now planted come into bearing, we shall be far in the lead of any of our sister states. The apple crop for the year has been a light one and yet has brought to our apple growers something like four million dollars. A full crop would bring to the State twenty million dollars.

The peach orchards have kept pace with the apple orchards and we find that Missouri is fast becoming the peach district of the United States. The crop of peaches last year was one of the smallest for years, and yet we find the crop a half million dollars in value. A full crop would bring four million dollars.

The number of trees now in orchards has so increased that Missouri will soon occupy the first place among all the states in peach orchards, as it does now in apple orchards.

Apples, peaches, strawberries and grapes are the four great fruits of the State. The vineyards along the Missouri River hills and on the top of the Ozark Mountains are increasing year by year, and a large portion of the fruit is made into wine. Many millions of pounds are sold in the markets of the State, but no great quantity is shipped out as in the case of the apple, peach or strawberry. Only an estimate can be given as to the value of the grape crop, because so many are made into wine, but a million dollars would no more than cover the full grape crop of the State.

The other berries, the cherries, plums, pears, and all other fruits

do so well in nearly all parts of the State that Missouri is becoming noted the world over as the great fruit State of the Union.

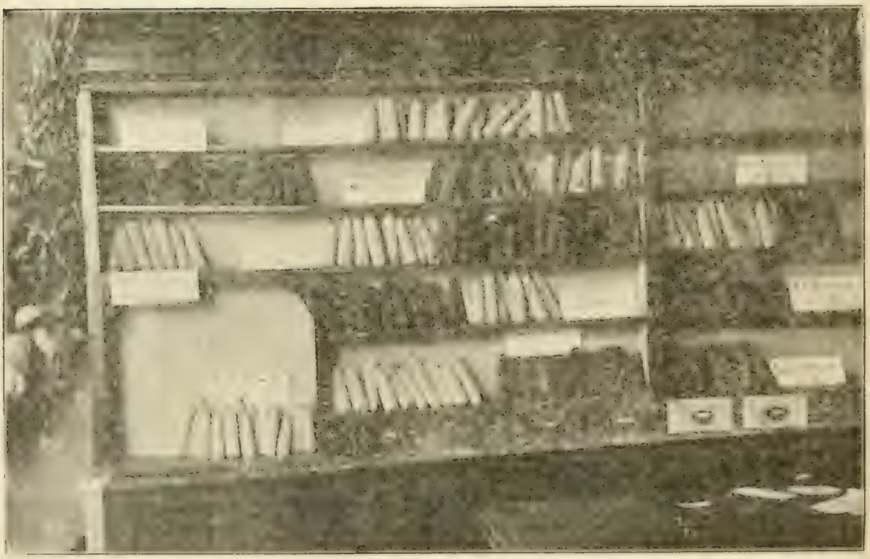
At the great St. Louis Fair, Missouri occupied more than double the space of any other State, and the results show how well we kept up the exhibit. During the season we showed six hundred and forty varieties of fruits of twenty-two different kinds, and forty-eight kinds of nuts. This wonderful display used over one hundred thousand plates of fruits during the seven months. Our awards were justified, surely:

Three grand prizes. (One for extent of exhibit, one for beauty of installation, one for educational features of the exhibit.)

Twenty-two gold medals.

One hundred and fifty silver medals.

One hundred and ninety bronze medals.



The above samples of corn were shown at Steedman Institute. All the corn was planted after June 20 and yielded from 40 to 75 bushels per acre. Courtesy of Jas. O. Erwin.

CORN, HAY AND FORAGE.

Table giving acreage, average yield per acre and total product of corn, and hay and forage by counties for the year 1904.

	Corn.			Hay and forage.	
	Acres planted.	Average yield per acre, bu..	Total yield per county, bu....	Acres.....	Total yield per county, tons.
State.	6,646,790	26.2	173,867,460	3,335,784	5,177,650
County.					
Adair	.58,670	30	1,760,100	66,645	98,635
Audrain	112,100	21	2,354,100	57,946	85,760
Andrew	77,695	24	1,864,680	30,471	52,105
Atchison	157,405	31	4,879,555	17,881	30,575
Barry	51,415	30	1,542,450	13,942	20,355
Barton	88,660	19	1,684,540	29,756	43,445
Bates	132,630	12	1,591,560	67,589	98,680
Benton	54,440	20	1,088,800	27,103	46,075
Bollinger	31,385	28	878,780	11,324	15,855
Boone	81,225	26	2,111,850	48,713	82,810
Buchanan	61,665	26	1.603,290	20,607	35,340
Butler	23,565	29	683,385	6,601	9,240
Caldwell	78,220	24	1,877,280	45,057	77,045
Callaway	75,910	25	1,897,750	51,435	87,440
Camden	30,855	25	771,315	11,396	19,370
Cape Girardeau	34,495	40	1,379,800	20,539	28,755
Carroll	130,540	22	2,871,080	49,079	83,925
Carter	10,775	25	268,875	2,322	3,250
Cass	106,170	12.5	1,723,125	61,148	89,275
Cedar	51,125	15	766,875	18,390	26,850
Chariton	67,790	27	1,827,630	55,597	94,515
Christian	43,430	30	1,302,900	13,780	20,120
Clark	79,335	43	3,411,405	47,880	70,865
Clay	66,170	27	1,786,590	20,465	35,490
Clinton	85,850	25	2,146,250	37,038	63,335
Cole	24,720	31	766,320	17,286	29,285
Cooper	75,140	33	2,479,620	24,618	41,850
Crawford	28,915	22	636,130	12,997	18,195
Dade	63,885	24	1,533,240	16,967	24,770
Dallas	41,040	27	1,108,080	19,165	32,580
Daviess	95,125	24	2,283,000	56,415	96,470
DeKalb	92,820	23	2,134,860	41,635	71,195
Dent	29,320	27	791,640	16,131	22,585
Douglas	40,300	29	1,168,700	13,251	19,345
Dunklin	42,240	32	1,351,680	5,000	7,000
Franklin	46,955	22	1,033,010	23,888	33,445
Gasconade	21,880	21	459,480	12,456	17,440
Gentry	86,345	22	1,899,590	52,495	90,535
Greene	72,675	35	2,543,625	26,405	38,550
Grundy	65,815	30	1,974,450	55,462	94,840
Harrison	124,875	35	4,370,625	80,255	137,235
Henry	103,575	17	1,760,775	45,430	66,330
Hickory	37,225	17.5	651,440	16,180	27,505
Holt	86,380	22	1,910,260	11,373	19,450
Howard	42,975	36	1,547,100	27,243	46,315
Howell	43,870	22	865,140	12,947	18,125
Iron	12,825	22	282,150	8,684	12,160
Jackson	100,735	25	2,518,375	42,175	72,120
Jasper	67,190	32	2,150,080	18,171	26,530
Jefferson	40,135	35	1,404,725	20,138	28,195
Johnson	98,380	21	2,065,980	54,971	80,260
Knox	57,580	30	1,727,400	58,460	86,520

CORN, HAY AND FORAGE—Continued.

County.	Corn. Acres planted.	Corn. Average yield per acre, bu.	Corn. Total yield per county, bu.	Hay and forage. Acres.	Hay and forage. Total yield per county, tons.
Laclede	35,455	28	992,740	24,109	40,985
Lafayette	111,210	31	3,447,510	35,071	59,970
Lawrence	53,740	30	1,612,200	13,062	19,070
Lewis	49,930	34	1,697,620	48,188	71,320
Lincoln	63,340	30	1,900,200	20,978	31,045
Linn	76,275	32	2,440,800	81,928	121,255
Livingston	86,795	32	2,777,440	50,653	86,615
McDonald	26,405	25	660,125	8,706	12,710
Macon	80,080	30	2,402,400	82,520	122,130
Madison	15,160	28	424,480	10,780	15,090
Maries	26,970	22	593,340	12,192	20,725
Marion	49,220	30	1,476,600	29,989	44,385
Mercer	57,675	33	1,903,275	58,632	100,260
Miller	32,305	25	807,625	16,631	28,275
Mississippi	38,385	35	1 339,975	4,469	6,255
Moniteau	40,760	32	1,304,320	25,506	43,360
Monroe	84,130	28	2,355,640	54,159	80,155
Montgomery	68,850	20	1,377,000	27,579	40,815
Morgan	37,455	27	1,011,285	23,523	39,990
New Madrid	40,900	33	1,349,700	2,612	3,655
Newton	40,010	25	1,000,250	10,986	16,040
Nodaway	220,600	20	4,412,000	56,502	96,620
Oregon	27,425	30	822,750	5,167	7,235
Osage	28,555	31	885,205	14,248	24,220
Ozark	30,585	26	795,210	3,668	5,355
Pemiscot	19,930	30	597,900	955	1,335
Perry	26,510	40	1,060,400	11,224	15,715
Pettis	95,550	17	1,624,350	45,763	77,795
Phelps	27,070	25	676,750	16,127	27,415
Pike	70,925	35	2,482,375	41,726	61,755
Platte	57,860	30	1,735,800	14,972	25,600
Polk	67,480	21	1,417,080	29,540	43,130
Pulaski	26,225	23	603,175	11,793	20,055
Putnam	51,230	30	1,536,900	67,756	100,280
Ralls	59,915	27	1,617,705	32,007	47,370
Randolph	49,190	26	1,278,940	21,649	70,805
Ray	100,045	23	2,301,035	43,759	74,830
Reynolds	14,405	20	288,100	8,732	12,225
Ripley	24,765	27	668,655	4,576	6,405
Saline	143,135	32	4,580,320	36,104	61,375
Schuyler	34,800	32	1,113,600	37,017	54,785
Scotland	51,760	25	1,294,000	51,429	76,115
Scott	35,460	38	1,347,480	7,238	10,135
Shannon	22,545	21	473,445	5,326	7,455
Shelby	68,010	32	2,176,320	53,863	79,715
Stoddard	53,135	32	1,700,320	8,051	11,270
Stone	31,085	28	870,380	7,525	10,985
St. Charles	41,505	30	1,245,150	16,792	24,850
St. Clair	70,285	14	983,990	30,537	44,585
St. Francois	19,700	30	591,000	15,144	21,200
Ste. Genevieve	17,090	30	512,700	9,228	12,920
St. Louis	36,920	30	1,107,600	32,057	44,880
Sullivan	62,095	32	1,987,040	94,212	139,435
Taney	27,280	30	818,400	3,543	5,175
Texas	50,015	27	1,350,405	25,194	35,270
Vernon	135,270	13	1,758,510	58,771	85,805
Warren	25,275	30	761,250	10,132	14,995
Washington	24,880	30	746,400	12,344	17,280
Wayne	26,860	27	725,760	10,862	15,205
Webster	38,285	23	880,555	21,628	31,575
Worth	50,055	24	1,201,320	26,039	44,525
Wright	33,320	23	766,360	19,400	28,325

WHEAT AND OATS.

Table giving acreage, average yield per acre and total product of Wheat and Oats by Counties for the year 1904.

	Wheat.			Oats.		
	Acres harvested.... ...	Average yield per acre bu...	Total yield per county bu....	Acres harvested........	Average yield per acre bu...	Total yield per county bu....
State	2,444,760	11.5	28,242,955	694,190	21.7	15,087,655
County.						
Audrain	1,125	11	12,375	24,795	19	471,105
Adair	2,140	12	25,680	2,840	28	79,520
Andrew	5,310	8	42,480	5,900	20	118,000
Atchison	7,135	8	57,080	20,905	15	313,575
Barry	58,460	9	526,140	5,825	25	145,625
Barton	10,805	13.5	145,870	12,840	15	192,600
Bates	18,850	10	188,500	12,825	15	192,375
Benton	10,010	10	100,100	7,740	22	170,280
Bollinger	27,780	12	333,360	5,800	23	133,400
Boone	22,755	10	227,550	7,095	26	184,470
Buchanan	30,115	10.5	316,210	4,945	19	93,955
Butler	1,895	11	20,845	1,275	25	31,875
Caldwell	2,140	10	21,400	2,405	18	43,290
Callaway	26,585	11	292,435	10,440	28	292,320
Camden	7,570	8	60,560	2,990	18	53,820
Cape Girardeau	70,890	13	921,570	7,160	20	143,200
Carroll	21,205	11	233,255	6,335	25	158,375
Carter	1,060	10	10,600	673	25	16,825
Cass	20,330	11	223,630	8,745	22	192,390
Cedar	13,740	9.5	130,530	7,905	15	118,575
Chariton	26,375	13	342,875	4,760	23	109,480
Christian	36,460	9	328,140	6,005	18	108,090
Clark	6,050	15	90,750	18,300	33	603,900
Clay	9,720	11	106,920	2,215	25	55,375
Clinton	3,675	12	44,100	5,405	25	135,125
Cole	36,330	11	399,630	4,005	23	92,115
Cooper	59,730	12	716,760	7,790	25	194,750
Crawford	18,950	8	151,600	2,495	18	44,910
Dade	33,810	10.5	355,005	14,135	25	328,375
Dallas	11,400	6	68,400	6,435	22	141,570
Daviess	4,955	11	54,505	3,235	25	80,875
DeKalb	2,035	13	26,455	3,895	26	101,270
Dent	15,480	8	123,840	2,220	16	35,520
Douglas	21,110	6	126,660	3,495	20	69,900
Dunklin	3,525	18	63,450	802	20	16,040
Franklin	84,125	15	1,261,875	7,985	20	159,700
Gasconade	39,140	10	391,400	4,573	15	68,625
Gentry	1,370	12	17,640	5,820	21	122,220
Greene	60,340	14	844,760	16,306	20	326,120
Grundy	2,970	13	38,610	2,165	32	69,280
Harrison	2,130	10	21,300	7,695	25	192,375
Henry	22,375	10	223,750	13,755	20	275,100
Hickory	7,305	8	58,440	5,530	18	99,540
Holt	8,545	8	68,360	13,925	14	194,950
Howard	42,070	10	420,700	2,405	25	60,125
Howell	31,480	7	220,360	4,190	20	83,800
Iron	2,325	9	20,925	1,115	18	20,070
Jackson	25,630	13	333,190	5,865	25	146,625
Jasper	73,935	16	1,182,960	17,009	20	340,180
Jefferson	32,235	14.5	467,410	2,740	28	76,720
Johnson	49,315	9	443,835	7,455	28	208,740
Knox	2,375	14	33,150	4,930	30	147,900
Laclede	12,840	7	89,880	4,465	20	89,300
Lafayette	42,215	9.5	401,045	11,660	30	349,800
Lawrence	94,350	14.5	1,368,075	15,758	24	378,190
Lewis	8,320	14	116,480	5,815	28	162,820

WHEAT AND OATS—Continued.

	Wheat.			Oats.		
County.	Acres harvested....	Average yield per acre, bu.	Total yield per county, bu..	Acres harvested	Average yield per acre, bu.	Total yield per county, bu...
Lincoln	45,860	10	458,600	13,880	19	263,720
Linn	3,840	10	38,400	3,685	25	92,125
Livingston	7,950	9.5	75,525	3,740	28	104,720
McDonald	22,755	9	204,795	2,275	20	45,500
Macon	6,170	13	80,210	2,910	30	87,300
Madison	9,200	12	110,400	1,580	20	31.600
Maries	13,590	6	81,540	3,030	18	54,540
Marion	19,890	12	238,680	3,550	22	113,600
Mercer	1,655	10	16,550	4,255	20	85,100
Miller	15,955	9.5	151,575	3,885	30	116,550
Mississippi	35,735	19	678,965	176	25	4,400
Moniteau	27,845	10	278,450	7,965	22	175,230
Monroe	7,995	11	87,945	8,405	22	184,910
Montgomery	18,740	14	262,360	15,520	24	372,480
Morgan	12,260	9	110,340	5,750	20	115,000
New Madrid	16,670	15	250,050	280	22	6,160
Newton	55,155	14	772,170	8,010	20	160,200
Nodaway	5,545	15	83,175	23,345	18	420,210
Oregon	12,505	11	137,555	3,287	20	65,700
Osage	39,315	9	353,835	2,805	19	53,295
Ozark	13,850	7.5	103,875	1,809	18	32,560
Pemiscot	5,220	14	73,080	65	20	1,300
Perry	49,955	10	499,550	5,070	20	101,400
Pettis	25,770	10	257,700	7,960	21	167,160
Phelps	13,365	7	93,555	3,905	22	85,910
Pike	44,375	10	443,750	10,625	22	233,750
Platte	46,250	13	601,250	3,095	32	99,040
Polk	26,685	7.5	200,140	13,620	18	245,160
Pulaski	9,845	8	78,760	2,175	20	43,500
Putnam	1,380	11	15,180	4,935	21	103,635
Ralls	14,740	10	147,400	6,205	28	173,740
Randolph	3,275	10	32,750	2,905	20.5	59,555
Ray	12,450	12	149,400	2,420	20	48,400
Reynolds	3,000	10	30,000	720	15	10,800
Ripley	5,515	10	55,150	2,631	23	60,515
Saline	62,055	10	620,550	6,980	27	188,460
Schuyler	1,920	9	17,280	3,485	25	87,125
Scotland	1,435	10	14,350	9,225	28	260,260
Scott	52,450	16	839,200	305	31	9,455
Shannon	3,775	11	41,525	913	15	13,695
Shelby	14,180	10.5	148,890	6,695	34	227,630
Stoddard	24,945	16	399,120	2,425	29	70 325
Stone	11,530	9	103,770	1,834	25	45,850
St. Charles	74,615	15	1,119,225	9,180	22	201,960
St. Clair	9,780	9	88,020	8,995	18	161,910
St. Francois	15,060	13	195,780	2,010	20	40,200
Ste. Genevieve	35,390	12	424,680	1,585	20	31,700
St. Louis	52,745	15	791,175	2,535	25	63,375
Sullivan	880	10	8,800	2,300	31	71,300
Taney	8,895	11	97,845	2,138	26	55,590
Texas	22,260	7	155,820	3,420	16	54,720
Vernon	15,195	10	151,950	10,600	16	169,600
Warren	29,610	12	355,320	9,410	22	207,020
Washington	16,980	9	152,820	2,315	15	34,725
Wayne	7,615	9	68,535	1,950	20	39,000
Webster	21,840	8	174,720	7,085	12	85,020
Worth	1,085	11	11,935	3,575	18	64,350
Wright	13,590	7	95,130	3,890	13	50,570

Summary of the Acreage, Yield and Value of farm crops for the Year 1904, for the State and by sections.

CORN.

Section.	Acres planted.	Average yield per acre, bu.	Total yield bushels.	Total value.
Northeast	1,245,125	29.8	37,117,605	$14,637,230
Northwest	1,994,330	26.1	51,899,065	21,278,220
Central	1,073,890	26.6	28,608,015	12,997,700
Southwest	1,473,180	21	31,000,910	13,049,560
Southeast	860,265	29	25,241,865	11,313,570
Whole State	6,646,790	26.2	173,867,460	$73,476,280

WHEAT.

Section.	Acres sown.	Acres harvested.	Average yield per acre, bu.	Total yield bushels.	Total value.
Northeast	314,545	305,640	12.1	3,714,825	$3,491,935
Northwest	265,585	244,185	11.1	2,720,835	2,475,555
Central	502,065	486,245	9.9	4,836,385	4,788,020
Southwest	740,325	710,785	11.4	8,080,270	7,415,455
Southeast	727,680	697,905	12.7	8,890,640	8,466,115
Whole State	2,550,200	2,444,760	11.5	28,242,955	$26,637,080

WHEAT SOWN FALL 1904.

Section.	Acres sown.	Acreage per cent. of previous year.	Average condition of crop, Dec. 1, 1904.	Five-year average condition, Dec. 1.
Northeast	303,460	97	75	93
Northwest	251,295	95	80	94
Central	478,875	95	76	91
Southwest	657,545	89	58	90
Southeast	692,105	95	76	93
Whole State	2,383,280	93.5	73	91

OATS.

Section.	Acres harvested.	Average yield per acre, bu.	Total yield in bu.	Total value.
Northeast	166,760	24.8	4,145,800	$1,285,210
Northwest	142,800	21	2,996,910	988,990
Central	111,015	22.9	2,546,970	840,505
Southwest	201,320	19.5	3,928,220	1,178,470
Southeast	72,295	20.3	1,469,755	485,020
Whole State	694,190	21.7	15,087,655	$4,778,195

HAY AND FORAGE.

Section.	Acres sown.	Average yield per acre, tons.	Total yield tons.	Total value
Northeast	981,206	1.48	1,452,180	$8,858,29
Northwest	845,476	1.71	1,447,585	7,501,825
Central	566,486	1.7	962,845	6,354,780
Southwest	615,630	1.46	857,265	5,665,525
Southeast	326,986	1.4	457,775	4,577,750
Whole State	3,335,784	1.55	5,177,650	$32,958,175

FLAX.

Section.	Acres sown.	Average yield per acre—bu.	Total yield bushels.	Total value.
Northeast	415	6	2,490	$2,600
Northwest	550	7.6	4,180	4,220
Central	1,985	8	13,880	15,720
Southwest	21,840	5.6	122,305	118,635
Southeast	....	....	....	....
Whole State	24,790	5.8	144,855	$141,265

RYE.

Section.	Acres sown.	Average yield per acre—bu.	Total yield bushels.	Total value.
Northeast	4,570	12	54,840	$34,550
Northwest	8,295	14	116,130	75,485
Central	1,730	13	22,490	14,845
Southwest	2,655	10	26,550	19,645
Southeast	3,335	11	36,685	25,315
Whole State	20,585	12	256,695	$169,840

BUCKWHEAT.

Section.	Acres sown.	Average yield per acre—bu.	Total yield bushels.	Total value.
Northeast	1,135	18	20,430	$14,915
Northwest	525	19	9,975	6,985
Central	165	15	2,475	2,625
Southwest	570	12.6	7,180	7,180
Southeast	40	16.2	650	565
Whole State	2,435	16.7	40,710	$32,270

BARLEY.

Section.	Acres sown.	Average yield per acre—bu.	Total yield bushels.	Total value.
Northeast	130	16	2,080	$1,375
Northwest	1,125	14	15,750	9,450
Central	130	16	2,080	1,600
Southwest	215	16	3,440	2,270
Southeast	440	16	7,040	4,225
Whole State	2,040	15	30,390	$18,920

BROOM CORN.

Section.	Acres sown.	Average yield per acre—lbs.	Total yield, pounds.	Total value.
Northeast	520	533	277,160	$8,315
Northwest	525	466	244,650	7,950
Central	805	275	221,375	6,860
Southwest	3,700	487	1,801,900	60,065
Southeast	180	440	79,200	2,535
Whole State	5,730	458	2,624,285	$85,725

COTTON.

Section.	Acres sown.	Average yield per acre—lbs.	Total yield, pounds.	Total value.
Northeast	....	....	....	....
Northwest	....	....	....	....
Central	....	....	....	....
Southwest	6,210	218.5	1,356,925	$124,840
Southeast	68,778	335	23,094,765	2,147,820
Whole State	74,988	313.7	24,451,690	$2,272,660

TOBACCO.

Section.	Acres planted.	Average yield per acre—lbs.	Total yield, pounds.	Total value.
Northeast	560	742	415,520	$45,705
Northwest	562	650	365,300	40,184
Central	1,207	700	844,900	92,940
Southwest	590	435	256,650	28,230
Southeast	719	665	473,100	52,040
Whole State	3,638	647.4	2,355,470	$259,100

POTATOES.

Section.	Acres planted.	Average yield per acre—bu.	Total yield, bushels.	Total value.
Northeast	13,170	114	1,501,380	$630,580
Northwest	22,075	91	2,007,825	823,210
Central	12,765	90	1,148,850	597,415
Southwest	15,660	86	1,346,760	686,850
Southeast	21,150	107	2,263,050	1,244,670
Whole State	84,820	97	8,267,865	$3,982,725

CROP CONDITIONS AND PRICES, DECEMBER 1, 1904.

CROP YIELDS, AVERAGE PER ACRE, 1904.

	N. E. Section.	N. W. Section.	Central Section.	S. W. Section.	S. E Section.	Whole State.
Corn, bushels	29.8	26.1	26.6	21	29	26.2
Kaffir corn, bushels	18	30	27	21	....	24
Sorghum seed, bushels	21	18	16.5	18	16.4	18
Sorghum syrup, gallons	73	84	105	78	95	87
Broom corn brush, pounds	533	466	275	487	440	458
Tobacco leaf, pounds	742	650	700	435	665	617.4
Cotton lint, pounds	....	....	....	218.5	335	312.7
Clover seed, bushels	2	1.71	2.5	1.85	2.17	2
Timothy seed, bushels	4.2	4.2	4.5	4.2	4.1	4.2
Flax seed, bushels	6	7.6	8	5.6	....	5.8
Buckwheat, bushels	18	19	15	12.6	....	16.7
Cow peas seed, bushels	12.5	....	10.5	8.8	14	11.5
Irish potatoes, bushels	114	91	90	86	107	97
Cow pea hay, tons	1.8	1.66	1.5	1.88	1.83	1.73
Clover hay, tons	1.7	1.73	1.75	1.66	1.54	1.68
Alfalfa hay, tons	3.6	2.86	2.75	2.5	2.3	2.8
Timothy hay, tons	1.48	1.71	1.7	1.46	1.4	1.55
Prairie hay, tons	1.97	1.53	1 4	1.14	....	1.51

AVERAGE PRICE OF PRODUCTS ON FARM NOV. 1.

	N. E. Section.	N. W. Section.	Central Section.	S. W. Section.	S. E Section.	Whole State.
Corn, per bushel	$ 39	$ 41	$ 45	$ 42	$ 44.8	$ 42
Wheat, per bushel	94	91	99	92	99	94
Oats, per bushel	31	53	33	30	33	31.7
Flax seed, per bushel	1 08	....	99	97	....	97.5
Timothy seed, per bushel	1 36	1 46	1 75	1 65	2 01	1 65
Clover seed, per bushel	5 90	5 77	5 85	5 80	5 55	5 77
Cow pea seed, per bushel	1 70	....	1 10	1 28	1 10	1 29
Sorghum seed, per bushel	81	53	91	60	80	73
Kaffir corn, per bushel	....	50	78	53	....	60
Rye, per bushel	63	65	66	74	77	66
Buckwheat, per bushel	73	70	1 06	1 00	....	79
Barley, per bushel	....	60	77	....	60	62
Irish potatoes, per bushel	42	41	52	51	50	48
Sweet potatoes, per bushel	81	90	70	72	55	74
Winter apples, per bushel	57	50	72	73	67	64
Timothy hay, per ton	6 10	5 10	6 60	6 61	10 00	6 37
Clover hay, per ton	5 20	4 70	5 80	5 93	8 90	6 10
Alfalfa hay, per ton	....	6 25	7 00	6 00	10 00	7 31
Cow pea hay, per ton	5 50	5 00	4 25	6 11	8 20	5 81
Prairie hay, per ton	3 90	4 25	4 25	4 71	....	4 28
Broom corn brush, per ton	63 00	65 00	62 50	66 66	....	65 34
Cotton lint, per pound	....	....	....	.092	.093	.093
Leaf tobacco, per pound	11	11	11	11	11	11
Wool, per pound	21	20	20	19	20	20

LIVE STOCK, CONDITION AS TO THRIFT AND HEALTH, DEC. 1, 1904.

Cattle	97	91	96	94	93	94
Horses	98	91	96	94	95	95
Mules	98	97	98	95	95	97
Hogs	96	86	89	93	89	91
Sheep	97	97	96	93	95	96

LIVE STOCK, AVERAGE PRICE PER HEAD DEC. 1, 1904.

	N. E. Section.	N. W. Section.	Central. Section.	S W. Section.	S. E. Section.	Whole State.
Horses.						
Spring colts	$37 97	$37 00	$38 03	$34 14	$34 00	$36 23
Yearlings	54 66	55 00	54 00	49 41	48 00	52 00
Two years and over	80 72	81 00	76 32	66 71	72 00	75 35
Mules.						
Spring colts	47 11	48 50	48 93	48 10	42 00	46 93
Yearlings	66 14	71 00	68 04	66 45	60 00	66 73
Two years and over	98 60	100 00	95 96	96 05	86 00	95 32
Cattle.						
Steer calves	13 06	12 00	11 41	7 48	7 00	10 19
Heifer calves	9 61	9 00	8 70	5 70	6 00	7 80
Yearling steers	20 88	20 00	18 07	14 67	11 65	17 05
Yearling heifers	16 04	13 00	13 45	10 74	10 16	12 68
Steers, 2 years and over	30 64	30 00	26 75	20 86	18 51	25 35
Cows, 2 years and over	24 23	26 00	21 66	18 24	17 36	21 50
Sheep.						
Lambs under 1 year	3 20	3 00	2 80	2 38	2 32	2 74
All other sheep	3 95	3 45	3 38	3 07	3 00	3 37
Chickens.						
Average price per lb.	7.6	7	7.4	7	7.4	7.3
Turkeys.						
Average price per lb	13	12	12	10.7	10.5	11.6
Honey.						
Average yield per colony, lbs	37	29	37	38	28	34
Average price per lb	11	11	12	12.5	13	12

SUMMARY OF YIELD AND VALUE OF ALL FARM CROPS FOR THE YEAR 1904, FOR THE STATE.

Crop.	Acreage.	Yield.	Value.
Corn	6,646,790	173,867,460 bu.	$73,476,280
Wheat	2,444,760	28,242,955 bu.	26,637,080
Oats	684,190	15,087,655 bu.	4,778,195
Hay	3,335,784	5,177,650 tons.	32,958,175
Flax	24,790	144,855 bu.	141,265
Rye	20,585	256,695 bu.	169,840
Buckwheat	2,435	40,710 bu.	32,270
Barley	2,040	30,390 bu.	18,920
Broom corn	5,730	2,624,285 lbs.	85,725
Cotton	74,988	24,451,690 lbs.	2,272,660
Tobacco	3,638	2,355,470 lbs.	259,100
Potatoes	84,820	8,267,865 bu.	3,982,725
*Sorghum syrup	32,000	2,784,000 gals.	974,400
*Sorghum seed	32,000	576,000 bu.	420,480
Clover seed	40,000	80,000 bu.	461,600
Timothy and other grass seeds	80,000	336,000 bu.	554,400
Kaffir corn, millet seed, cow peas, castor beans, etc			1,000,000
Miscellaneous vegetables	110,000		6,000,000
			$155,216,590

*Same acreage produced both seed and syrup.

MISSOURI COUNTIES.

Table giving total number acres of land listed for taxes, acres in improved farms, acres in cultivated crops, number of farms and average size of farms.

	Number of farms.	Average size of farms in acres.	Acres of land listed for taxes.	Acres in improved farms.	Acres in all cultivated crops.
State	284,886	119.3	42,448,686	22,900,043	15,388,290
County.					
Adair	2,696	118.4	360,600	240,892	148,034
Andrew	2,562	104.5	273,988	222,664	144,246
Atchison	2,149	156.6	336,473	302,117	234,736
Audrain	2,770	149.9	433,155	372,861	220,048
Barry	3,709	91.5	470,926	202,178	144,271
Barton	2,590	134.2	375,878	311,024	174,403
Bates	4,070	126.6	537,512	444,528	287,623
Benton	2,575	142.8	469,123	190,928	122,261
Bollinger	2,298	119.4	384,667	129,470	81,903
Boone	3,540	115.3	422,426	301,732	171,681
Buchanan	2,584	90.3	245,240	177,312	138,219
Butler	1,577	97.7	428,364	55,664	37,405
Caldwell	2,329	118.9	272,725	246,077	146,856
Callaway	3,585	135	514,475	340,989	179,132
Camden	2,069	137.4	382,472	82,857	59,619
Cape Girardeau	2,576	135.5	258,566	211,544	139,688
Carroll	3,692	113.6	442,157	371,073	234,095
Carter	554	115.7	217,374	22,873	15,578
Cass	3,225	127.7	442,165	363,474	243,035
Cedar	2,765	101	315,619	185,840	113,900
Chariton	3,805	118.4	475,764	350,567	186,606
Christian	2,648	97.5	344,106	149,140	100,209
Clark	2,514	122.3	319,489	224,651	151,289
Clay	2,203	107	251,123	197,550	113,601
Clinton	2,024	135.2	265,000	251,250	152,861
Cole	1,700	132.2	233,886	119,476	86,018
Cooper	2,664	127	350,876	264,760	182,292
Crawford	1,914	139.1	456,911	100,045	62,692
Dade	2,732	107.8	315,358	207,587	140,586
Dallas	2,397	107.5	316,687	125,231	81,418
Daviess	3,308	106.9	357,399	279,050	186,390
DeKalb	2,377	110	272,726	222,284	153,854
Dent	1,748	157.2	470,058	101,513	65,984
Douglas	2,738	127.1	469,235	126,885	81,437
Dunklin	2,542	56.5	330,061	101,173	96,033
Franklin	2,853	121.1	533,572	263,711	183,550
Gasconade	1,799	164	321,059	109,491	84,177
Gentry	2,699	111.4	310,216	227,449	160,970
Greene	4,320	85.4	416,783	278,721	198,741
Grundy	2,298	118.6	273,407	197,384	133,411
Harrison	3,876	117	458,933	328,598	219,595
Henry	3,447	127	469,839	370,976	218,997
Hickory	1,768	123.3	252,245	101,897	71,677
Holt	2,256	117.9	281,643	224,996	151,985
Howard	2,037	140.2	289,208	213,894	130,340
Howell	3,065	136.1	573,623	153,710	103,796
Iron	880	116.2	233,316	41,784	25,290
Jackson	3,681	97.5	358,990	284,122	198,493
Jasper	3,054	112	401,084	270,236	197,659
Jefferson	2,596	132.6	397,247	156,055	96,551
Johnson	3,869	126.2	517,553	411,544	263,264
Knox	2,133	145	321,103	252,685	146,875
Laclede	2,614	110.9	425,100	131,942	88,884
Lafayette	3,043	120.8	387,271	326,718	232,725
Lawrence	3,414	103.1	[illegible]88,804	264,343	192,462
Lewis	2,277	136	319,330	235,437	131,107

MISSOURI COUNTIES—Continued.

County.	Number of farms.	Average size of farms in acres.	Acres of land listed for taxes.	Acres in improved farms.	Acres in all cultivated crops.
Lincoln	2,763	92.9	390,811	252,984	160,612
Linn	2,925	134.5	384,231	304,720	176,342
Livingston	2,752	116.7	334,902	246,638	152,184
McDonald	2,066	90.3	302,643	87,712	66,171
Macon	4,233	114.9	534,873	364,444	198,375
Madison	1,163	127	289,351	67,225	39,816
Maries	1,619	153.5	329,522	92,440	59,576
Marion	2,022	132.4	276,212	199,145	112,830
Mercer	2,507	116.4	285,786	235,774	133,359
Miller	2,251	123.3	384,636	116,683	77,918
Mississippi	1,150	121.6	259,890	97,453	86,473
Moniteau	2,144	119.2	258,410	183,348	117,175
Monroe	3,217	126	422,033	331,911	180,584
Montgomery	2,264	133.8	334,658	207,008	137,818
Morgan	2,013	132.9	386,600	139,649	89,748
New Madrid	1,063	114.6	428,460	90,635	75,945
Newton	3,043	92.1	351,698	193,560	126,375
Nodaway	4,490	123.9	554,360	486,462	339,613
Oregon	1,880	119.6	484,298	86,426	57,699
Osage	2,022	168.7	368,727	137,186	92,960
Ozark	2,029	135.7	343,755	79,085	57,105
Pemiscot	1,201	71.5	299,279	47,361	42,135
Perry	1,936	133.9	295,750	139,945	95,910
Pettis	2,935	139.2	426,900	344,869	212,839
Phelps	2,013	126.3	393,459	106,241	65,600
Pike	2,873	138.3	421,419	294,947	187,615
Platte	2,042	128	259,009	182,567	142,719
Polk	3,673	98.2	406,359	234,426	151,188
Pulaski	1,512	129	269,825	75,660	56,629
Putnam	2,596	125.9	338,783	246,194	137,233
Ralls	1,996	144.3	302,490	230,319	130,217
Randolph	2,460	116.9	305,200	224,515	107,370
Ray	3,321	102.6	355,658	288,627	187,829
Reynolds	1,165	103.3	502,760	50,271	28,567
Ripley	1,740	91.8	379,127	63,496	42,982
St. Charles	2,297	130.7	339,949	220,491	165,241
St. Clair	2,851	121.9	437,462	219,404	145,966
St. Francois	1,277	162.6	280,382	97,765	53,664
Ste. Genevieve	1,364	169	306,968	94,600	64,477
St. Louis	3,908	64.8	297,255	206,863	146,198
St. Louis City	826	14	11,523	9,305	....
Saline	3,638	120.7	459,668	334,236	275,414
Schuyler	1,654	120	194,565	162,867	87,516
Scotland	2,118	131.1	278,031	222,498	130,346
Scott	1,341	135.6	263,259	125,094	99,014
Shannon	1,311	120.5	625,158	50,665	32,599
Shelby	2,475	124.2	316,461	245,638	156,473
Stoddard	2,873	79.2	519,425	142,759	105,634
Stone	1,627	104.8	271,921	73,127	52,481
Sullivan	3,101	129.9	413,135	323,868	170,594
Taney	1,671	144.5	287,500	66,988	45,245
Texas	3,729	135.5	691,774	185,681	110,412
Vernon	3,988	121.6	530,015	408,694	250,815
Warren	1,358	160.3	258,656	116,770	84,353
Washington	1,724	123.6	465,150	93,743	60,528
Wayne	1,733	113.9	478,204	83,022	53,344
Webster	2,500	105.3	360,351	143,960	92,223
Worth	1,549	106.4	169,545	119,169	85,700
Wright	2,726	119.8	407,575	139,272	79,374

MISSOURI COUNTIES.

Table giving area, population, assessed valuation of land, assessed valuation of town lots and total taxable wealth by counties.

(State Auditor's Report, 1903-4.)

	Area in square miles.	Population U. S. census 1900.	Assessed valuation of lands.	Assessed valuation town lots.	Total taxable wealth.
State	68,735	3,106,665	$361,133,833	$506,523,829	$1,284,294,571
County.					
Adair	570	21,728	$2,530,900	$1,207,810	$5,945,675
Andrew	420	17,332	4,083,880	468,385	7,306,788
Atchison	560	16,501	4,918,550	747,630	9,070,402
Audrain	680	21,160	4,138,630	1,384,140	10,160,747
Barry	810	25,532	2,107,702	546,455	4,239,713
Barton	612	18,253	3,154,663	736,125	6,140,134
Bates	874	30,141	5,622,742	1,126,679	10,117,014
Benton	744	16,556	2,726,659	202,560	4,260,511
Bollinger	616	14,650	1,301,660	98,945	2,526,201
Boone	680	28,642	4,262,135	1,940,030	10,014,102
Buchanan	420	121,838	6,630,410	21,506,331	38,674,096
Butler	716	16,769	1,546,585	992,923	4,146,371
Caldwell	430	16,656	3,473,990	567,870	6,977,831
Callaway	760	25,984	3,261,590	838,640	7,018,102
Camden	692	13,113	1,237,030	54,175	2,052,940
Cape Girardeau	540	24,315	2,604,425	1,227,605	6,175,874
Carroll	690	26,455	5,097,653	1,010,685	10,241,225
Carter	500	6,706	822,737	34,089	1,570,817
Cass	688	23,636	5,160,290	858,949	9,938,298
Cedar	496	16,923	2,291,109	423,176	3,859,606
Chariton	740	26,826	4,489,404	606,084	8,368,540
Christian	556	16,939	1,753,003	193,000	3,160,056
Clark	510	15,383	2,559,850	417,190	5,009,991
Clay	415	18,903	3,725,355	1,181,119	8,727,157
Clinton	440	17,363	3,432,360	889,575	8,035,072
Cole	390	20,578	1,586,815	1,773,805	5,349,413
Cooper	562	22,532	3,995,650	1,142,450	8,678,551
Crawford	710	12,959	1,691,804	204,435	3,012,495
Dade	500	18,125	2,097,090	363,580	4,034,833
Dallas	530	13,903	1,110,598	119,855	2,019,184
Daviess	576	21,325	4,470,234	624,644	8,876,442
DeKalb	440	14,418	3,143,251	351,550	5,966,365
Dent	720	12,986	1,288,676	217,890	2,419,780
Douglas	792	16,802	1,425,001	43,369	2,092,083
Dunklin	500	21,706	1,916,523	685,450	4,547,840
Franklin	866	30,581	3,945,105	1,012,635	8,108,848
Gasconade	510	12,298	1,756,057	417,462	4,042,449
Gentry	450	20,554	3,765,360	752,560	7,628,821
Greene	688	52,713	3,456,681	6,282,181	14,342,141
Grundy	460	17,832	2,613,893	953,078	6,240,344
Harrison	730	24,398	4,445,040	677,721	8,500,083
Henry	740	28,054	4,878,840	1,373,060	9,486,702
Hickory	415	9,985	1,192,155	91,290	2,232,245
Holt	462	17,083	3,640,660	731,525	7,444,765
Howard	450	18,337	2,971,915	877,815	6,634,802
Howell	920	21,834	1,797,165	497,505	3,804,135
Iron	550	8,716	1,206,872	198,418	2,558,750
Jackson	630	195,193	14,029,400	66,536,029	112,895,131
Jasper	672	84,018	6,052,215	5,770,225	18,419,544
Jefferson	640	25,712	2,643,460	957,999	6,064,502
Johnson	800	27,843	5,503,780	1,444,090	11,421,531
Knox	510	13,479	2,518,135	267,205	4,643,010
Laclede	740	16,523	1,510,535	310,440	3,125,744
Lafayette	622	31,679	5,386,325	1,445,155	11,402,953
Lawrence	606	31,662	3,001,291	908,623	6,323,367
Lewis	510	16,724	2,528,970	615,690	5,391,309

MISSOURI COUNTIES—continued.

County.	Area in square miles.	Population, U. S. census 1900.	Assessed valuation of land.	Assessed valuation town lots.	Total taxable wealth.
Lincoln	598	18,352	$3,158,560	$391,460	$5,406,686
Linn	620	25,503	3,571,027	1,264,752	7,544,766
Livingston	520	22,302	3,309,765	1,141,701	7,361,658
McDonald	580	13,574	1,275,224	119,312	2,259,319
Macon	820	33,018	5,946,773	1,282,846	11,364,373
Madison	492	9,975	1,061,240	373,700	2,318,117
Maries	515	9,616	1,103,224	77,350	1,836,293
Marion	420	26,331	3,167,160	3,002,260	9,678,025
Mercer	484	14,706	2,993,553	203,200	5,070,947
Miller	590	15,187	1,443,555	182,105	2,719,990
Mississippi	430	11,837	1,395,300	412,955	3,191,685
Moniteau	420	15,931	1,816,280	633,580	4,865,743
Monroe	644	19,716	3,811,900	630,440	7,337,369
Montgomery	546	16,571	2,438,745	519,350	5,155,260
Morgan	638	12,175	1 546,275	161,915	2,756,115
New Madrid	620	11,280	1,917,135	234,815	3,410,456
Newton	648	27,001	3,242,650	731,380	6,192,368
Nodaway	848	32,938	6,806,035	1,268,968	12,439,425
Oregon	780	13,906	1,244,118	206,470	2,147,516
Osage	586	14,096	1,909,215	274,530	4,070,444
Ozark	780	12,145	801,984	8,537	1,332,317
Pemiscot	480	12,115	1,514,355	342,670	3,330,215
Perry	436	15,134	1,473,230	257,265	3,195,689
Pettis	688	32,438	5,148,820	3,191,140	12,225,585
Phelps	640	14,194	1,412,984	382,107	2,887,132
Pike	620	25,744	5,088,350	1,662,280	10,187,006
Platte	410	16,193	3,594,730	444,650	6,708,008
Polk	640	23,255	2,154,450	535,775	4,811,363
Pulaski	520	10,394	929,205	178,260	2,123,111
Putnam	542	16,688	2,584,597	320,515	4,643,027
Ralls	490	12,287	3,218,120	255,380	5,139,258
Randolph	470	24,442	3,366,404	1,721,138	8,185,495
Ray	584	24,805	3,887,270	718,340	9,004,810
Reynolds	830	8,161	1,110,398	22,037	1,712,861
Ripley	640	13,186	1,492,297	219,853	2,346,730
St. Charles	520	24,474	4,548,430	1,840,000	11,701,340
St. Clair	690	17,907	2,304,550	332,600	4,360,794
St. Francois	410	24,051	3,888,895	596,850	6,468,398
Ste. Genevieve	450	10,395	1,140,480	327,500	2,216,741
St. Louis	492	50,040	20,274,100	6,646,210	35,552,012
St. Louis City	48	575,238	14,230,600	329,395,160	457,735,457
Saline	760	33,703	6,379,960	1,551,410	12,622,665
Schuyler	336	10,840	1,458,392	237,955	3,150,866
Scotland	440	13,232	2,346,000	393,970	4,741,976
Scott	434	13,092	1,914,945	484,969	4,467,862
Shannon	960	11,247	1,304,748	64,928	2,178,576
Shelby	514	16,167	2,877,663	507,455	5,954,559
Stoddard	840	24,669	2,388,335	562,402	4,959,169
Stone	516	9,892	1,012,794	34,309	1,586,656
Sullivan	656	20,282	2,674,953	322,413	5,755,691
Taney	660	10,127	771,673	49,050	1,329,172
Texas	1,145	22,192	1,997,227	139,678	3,388,816
Vernon	850	31,619	4,862,090	1,394,844	10,111,562
Warren	435	9,919	1,633,495	162,020	3,701,677
Washington	780	14,263	1,769,410	193,770	3,068,412
Wayne	800	15,309	1,129,787	173,930	3,053,510
Webster	630	16,640	1,650,335	224,670	3,564,547
Worth	270	9,832	1,774,606	250,980	3,341,362
Wright	700	17,519	1,422,648	24,780	2,877,120

MISSOURI LIVE STOCK.

The following table compiled from the State Auditor's report 1903-4, gives the number of horses, mules, asses and jennets listed for taxes in the various counties of the State; also the assessed value. The number of stock listed for taxation is considerably below the actual number, because the rule is not to include in the list stock under one year old. The valuation of live stock is about one-third the actual value:

	Horses.		Mules.		Asses and jennets.	
	Number.	Valuation.	Number.	Valuation.	Number.	Valuation.
State	782,670	$21,560,383	242,463	$7,502,084	7,960	$401,253
County.						
Adair	8,437	$222,655	999	$30,668	82	$3,090
Andrew	6,059	158,305	1,738	58,149	91	6,120
Atchison	8,055	214,860	2,785	90,290	35	2,210
Audrain	8,927	261,626	3,725	135,270	191	8,355
Barry	8,245	200,824	2,132	61,317	87	3,075
Barton	9,343	202,132	2,148	55,512	81	3,430
Bates	14,258	357,836	2,945	88,318	149	6,534
Benton	7,235	164,700	1,543	47,957	83	3,710
Bollinger	4,324	127,989	1,978	69,669	35	2,555
Boone	7,541	224,890	3,204	109,285	121	5,715
Buchanan	9,296	265,060	2,446	78,639	83	3,350
Butler	3,151	86,120	998	29,970	23	1,205
Caldwell	7,509	181,343	1,270	34,295	41	3,640
Callaway	8,668	214,210	3,970	124,660	258	12,840
Camden	4,181	121,050	1,177	35,963	36	1,945
Cape Girardeau	6,123	171,120	2,620	83,710	79	4,175
Carroll	11,063	279,018	4,192	121,865	117	5,232
Carter	968	28,189	705	24,580	16	350
Cass	11,682	307,083	3,026	92,211	104	6,250
Cedar	7,638	213,696	1,550	52,969	53	5,149
Chariton	11,173	289,308	2,957	93,225	93	4,760
Christian	5,664	158,792	1,725	52,115	103	4,151
Clark	6,745	186,810	879	29,561	17	1,555
Clay	6,386	186,500	1,610	50,325	61	8,345
Clinton	6,850	190,108	2,285	73,442	59	3,355
Cole	3,178	91,100	1,107	32,760	15	410
Cooper	6,978	189,925	4,061	150,071	101	4,950
Crawford	3,141	87,928	1,441	46,368	23	1,170
Dade	6,881	165,466	1,883	54,254	97	4,795
Dallas	5,946	148,554	1,477	36,799	82	2,701
Daviess	12,127	320,476	2,496	76,822	120	7,235
DeKalb	7,149	210,988	1,163	36,588	59	2,900
Dent	3,607	106,491	1,614	50,885	63	2,916
Douglas	5,025	134,904	1,016	30,664	44	1,498
Dunklin	5,134	137,155	3,518	122,028	21	1,475
Franklin	5,913	162,485	2,834	83,725	31	1,540
Gasconade	3,193	93,230	2,107	66,840	39	1,335
Gentry	10,385	284,730	1,393	42,090	89	7,310
Greene	12,325	340,483	3,410	102,856	98	4,350
Grundy	7,420	183,603	1,220	32,655	91	2,670
Harrison	14,678	365,858	1,811	49,129	110	5,950
Henry	9,901	312,015	2,366	79,148	52	4,340
Hickory	4,908	142,082	1,182	35,992	54	4,040
Holt	7,666	201,476	2,100	61,610	36	2,510
Howard	5,835	157,041	3,229	103,520	102	5,305
Howell	4,658	125,728	1,470	48,347	56	2,365
Iron	1,515	41,451	652	21,824	23	770
Jackson	19,122	628,635	3,320	148,981	....	....
Jasper	12,242	499,599	2,168	72,982	66	3,850
Jefferson	5,122	137,514	2,263	66,358	58	2,065
Johnson	12,085	374,390	4,121	144,675	171	9,065
Knox	5,807	146,593	1,276	34,526	84	3,670

MISSOURI LIVE STOCK—Continued.

County.	Horses. Number.	Horses. Valuation.	Mules. Number.	Mules. Valuation.	Asses and jennets. Number.	Asses and jennets. Valuation.
Laclede	5,810	$159,128	1,679	$54,222	110	$2,924
Lafayette	10,836	319,505	4,707	164,174	106	6,785
Lawrence	9,108	243,386	3,111	94,774	93	4,655
Lewis	6,741	186,710	1,640	50,235	51	2,905
Lincoln	6,504	162,510	1,067	34,485	13	1,065
Linn	9,877	248,424	1,197	33,187	40	2,625
Livingston	9,789	256,374	1,321	38,750	52	2,305
McDonald	4,472	112,520	1,304	36,025	30	1,230
Macon	13,498	410,505	3,384	102,960	223	8,540
Madison	2,340	66,770	1,244	41,925	33	1,730
Maries	3,129	75,543	1,710	54,954	31	1,265
Marion	6,258	162,635	1,010	33,045	46	2,355
Mercer	7,255	159,356	853	30,830	30	1,982
Miller	5,126	139,680	1,534	46,505	35	1,445
Mississippi	2,042	62,135	3,560	123,948	23	1,465
Moniteau	5,144	129,016	2,318	61,545	69	3,310
Monroe	8,704	243,660	3,099	86,390	121	7,850
Montgomery	5,193	158,035	1,767	59,603	77	2,570
Morgan	4,759	127,410	2,026	56,985	86	3,190
New Madrid	2,226	50,240	2,946	71,110	17	520
Newton	8,776	212,010	1,477	39,140	53	1,665
Nodaway	16,429	410,846	2,473	75,028	84	3,040
Oregon	3,466	70,375	1,320	33,682	33	725
Osage	3,224	90,720	2,676	94,445	23	1,510
Ozark	3,094	86,334	874	27,951	25	1,710
Pemiscot	2,382	59,490	3,234	109,407	25	1,420
Perry	4,377	124,250	2,536	77,758	43	1,680
Pettis	10,415	286,065	3,397	105,610	132	6,060
Phelps	3,444	96,549	1,296	43,030	66	2,000
Pike	7,430	228,008	2,132	75,627	249	21,450
Platte	5,272	155,270	2,159	76,512	67	4,825
Polk	8,515	240,327	2,255	76,554	102	6,220
Pulaski	3,503	82,275	967	24,650	49	1,380
Putnam	9,480	233,348	1,131	30,291	60	2,405
Ralls	3,864	121,635	1,069	35,975	58	2,890
Randolph	7,230	216,392	1,678	62,480	159	9,705
Ray	9,697	285,590	3,275	124,835	131	7,180
Reynolds	1,953	58,575	1,264	41,570	11	915
Ripley	2,011	66,068	1,124	37,099	26	1,313
St. Charles	7,211	208,086	2,460	92,592	37	2,463
St. Clair	8,258	231,430	1,637	45,460	70	3,360
St. Francois	3,040	78,015	918	27,680	13	600
Ste. Genevieve	2,646	75,560	1,100	34,505	23	1,585
St. Louis	7,153	252,405	3,328	135,880	....	....
St. Louis City	12,250	390,000	1,060	36,000	....	....
Saline	10,899	317,170	5,567	202,692	137	8,600
Schuyler	6,563	171,295	1,049	30,985	36	1,450
Scotland	6,689	187,565	1,000	29,310	67	2,135
Scott	2,976	91,031	3,768	121,677	19	1,170
Shannon	2,166	60,044	999	31,955	33	1,310
Shelby	8,687	245,775	2,656	78,007	144	6,480
Stoddard	5,841	163,454	3,110	110,566	62	2,832
Stone	3,234	94,616	928	30,384	27	890
Sullivan	11,246	276,677	1,373	36,055	125	4,733
Taney	3,101	80,112	809	25,931	55	1,350
Texas	6,202	166,226	1,903	61,949	120	4,277
Vernon	13,269	369,348	2,864	84,915	122	5,943
Warren	3,242	78,025	1,270	38,190	26	935
Washington	2,891	65,810	1,435	35,255	19	865
Wayne	3,280	96,415	1,839	55,565	25	1,420
Webster	5,863	163,985	1,987	63,545	123	3,625
Worth	5,989	156,620	457	13,004	29	1,085
Wright	5,134	138,896	1,487	46,234	83	3,045

MISSOURI LIVE STOCK.

The following table compiled from the State Auditor's report, 1903-4, gives the number of neat cattle, sheep and hogs listed for taxes in the various counties of the State, also the assessed value. The number of stock listed for taxation is considerably below the actual number because the rule is not to include in the list stock under one year old. The valuation of live stock is about one-third the actual value.

	Neat Cattle.		Sheep.		Hogs.	
	Number.	Valuation.	Number.	Valuation.	Number.	Valuation.
State	2,544,824	$34,515,537	656,878	$1,002,572	2,215,581	$5,722,421
County.						
Adair	29,026	$382,974	4,421	$5,880	12,101	$46,405
Andrew	33,012	538,655	2,272	2,340	27,221	94,470
Atchison	36,098	614,725	922	1,810	42,279	120,725
Audrain	31,728	525,910	13,142	24,545	25,073	90,905
Barry	20,486	193,407	6,215	6,629	20,496	33,867
Barton	27,208	292,549	2,740	2,835	15,680	35,547
Bates	39,597	492,158	2,895	3,681	29,432	81,896
Benton	25,406	344,450	6,421	9,080	16,602	49,440
Bollinger	14,348	137,245	8,951	12,140	18,804	28,175
Boone	21,288	323,685	7,577	16,725	20,335	47,520
Buchanan	20,391	324,819	1,633	3,774	20,225	63,316
Butler	12,235	92,672	894	982	11,239	14,583
Caldwell	28,640	424,679	8,640	13,021	29,307	91,755
Callaway	21,295	299,215	16,399	29,253	15,257	57,504
Camden	18,050	260,803	10,984	21,809	14,067	30,439
Cape Girardeau	14,298	136,064	6,795	10,315	22,676	40,990
Carroll	33,161	499,499	3,636	3,704	31,539	81,877
Carter	5,841	62,347	589	767	7,004	9,528
Cass	37,328	506,663	4,014	5,713	38,705	104,223
Cedar	18,920	277,949	3,763	6,125	24,912	64,222
Chariton	33,259	505,067	6,651	11,143	23,109	60,405
Christian	17,984	196,165	6,432	9,214	21,560	33,805
Clark	21,427	298,830	4,993	7,235	10,036	48,655
Clay	23,940	368,197	6,204	11,765	22,006	64,530
Clinton	31,142	524,056	3,954	8,346	24,028	82,082
Cole	9,938	116,930	2,115	2,435	11,405	21,437
Cooper	22,682	328,970	5,535	11,195	28,599	80,910
Crawford	12,507	172,704	5,864	9,271	11,798	24,190
Dade	19,612	216,053	3,480	6,047	18,485	40,936
Dallas	17,884	180,438	10,297	13,074	18,326	27,319
Daviess	41,722	629,203	13,122	21,644	37,477	95,855
DeKalb	35,090	557,304	4,204	7,109	25,429	76,217
Dent	14,464	156,953	7,111	8,915	16,579	24,458
Douglas	15,637	175,587	13,471	20,133	16,858	27,876
Dunklin	20,065	189,084	334	490	27,546	41,486
Franklin	13,905	207,421	3,342	4,484	21,118	48,283
Gasconade	10,848	122,580	3,231	3,267	12,846	26,482
Gentry	38,647	573,688	7,837	11,265	25,613	87,150
Greene	26,713	329,505	5,585	7,947	22,745	48,959
Grundy	32,072	473,916	8,124	8,367	15,652	52,641
Harrison	54,042	885,717	10,565	20,699	38,687	143,078
Henry	30,980	448,035	1,967	3,590	23,178	84,135
Hickory	18,985	242,516	5,584	8,351	16,793	44,791
Holt	22,469	332,600	1,173	1,860	30,949	153,260
Howard	19,873	311,080	5,102	10,425	15,123	46,150
Howell	14,638	157,607	8,247	8,257	20,975	21,017
Iron	6,423	72,129	2,395	2,607	6,428	8,738
Jackson	29,780	488,057	5,053	8,240	28,998	119,142
Jasper	25,012	377,053	2,671	3,309	16,041	44,905
Jefferson	16,215	168,005	2,290	3,086	16,519	34,075
Johnson	39,560	576,135	5,630	5,630	34,059	109,420
Knox	25,585	361,355	5,663	6,252	15,311	41,398

MISSOURI LIVE STOCK—Continued.

	Neat Cattle.		Sheep.		Hogs.	
County.	Number.	Valuation.	Number.	Valuation.	Number.	Valuation.
Laclede	18,171	$228,396	11,010	$14,953	18,190	$31,024
Lafayette	33,561	551,500	3,601	6,535	30,229	11,195
Lawrence	18,007	237,736	2,921	3,213	16,935	46,112
Lewis	22,054	328,020	9,642	10,060	15,303	70,335
Lincoln	18,435	267,790	4,111	5,665	16,785	47,635
Linn	44,146	531,873	7,908	9,227	16,304	42,535
Livingston	29,012	412,516	5,293	7,728	22,910	59,326
McDonald	14,871	164,119	5,038	5,038	14,363	18,027
Macon	43,057	665,100	8,055	12,425	24,782	63,275
Madison	9,247	102,536	2,981	3,322	9,716	13,488
Maries	14,344	153,378	6,390	6,390	15,679	15,679
Marion	13,022	201,215	7,356	15,165	10,200	40,850
Mercer	34,864	543,346	2,977	7,155	14,852	59,785
Miller	19,519	201,035	10,914	12,105	16,125	29,900
Mississippi	10,976	100,701	281	345	13,750	24,707
Moniteau	16,549	198,874	2,665	4,380	18,938	42,700
Monroe	25,720	383,310	22,189	33,480	19,465	61,030
Montgomery	18,420	276,017	4,885	9,455	19,212	59,130
Morgan	10,281	156,230	5,944	7,416	9,789	26,469
New Madrid	10,834	68,956	456	640	13,721	14,204
Newton	17,497	226,592	451	535	11,386	28,624
Nodaway	65,141	837.327	2,877	2,818	57,564	146,493
Oregon	17,543	174,534	3,679	3,679	16,918	16,918
Osage	14,522	164,059	3,678	4,694	15,672	28,748
Ozark	18,258	211,141	6,240	9,947	15,099	28,029
Pemiscot	15,334	151,138	351	676	19,980	39,700
Perry	10,958	108,340	7,121	9,162	24,625	33,915
Pettis	35,568	536,516	4,797	7,671	23,467	79,041
Phelps	15,103	179,720	6,772	7,343	13,624	19,859
Pike	20,041	300,470	8,270	17,910	17,820	68,160
Platte	14,652	239,200	3,639	5,105	16,113	48,180
Polk	21,117	297,450	9,230	10,210	27,984	42,295
Pulaski	13,610	146,790	8,681	10,465	12,156	18,385
Putnam	37,151	500,150	7,709	8,362	14,839	37,005
Ralls	14,504	206,090	7,467	12,345	7,585	27,235
Randolph	19,874	331,380	7,470	14,680	10,367	39,845
Ray	30,354	505,385	3,881	5,520	43,080	122,160
Reynolds	12,335	129,091	3,733	3,787	16,019	21,439
Ripley	11,612	122,321	3,341	4,485	13,191	22,636
St. Charles	15,037	197,556	2,966	6,587	23,675	77,276
St. Clair	26,479	295,680	3,717	4,765	17,496	45,720
St. Francois	8,506	87,900	1,001	1,480	3,757	7,265
Ste. Genevieve	7,762	77,896	2,870	3,470	10,975	14,894
St. Louis	9,423	158,655	612	1,040	12,467	41,585
St. Louis City	6,420	103,510	....	....	....	....
Saline	44,073	659,240	2,972	4,905	29,019	113,760
Schuyler	18,335	266,616	22,140	22,140	12,287	34,281
Scotland	26,578	358,355	6,475	7,870	12,518	41,600
Scott	11,896	111,861	775	799	18,863	25,947
Shannon	12,421	136,083	1,880	2,002	14,475	15,467
Shelby	25,707	367,097	12,134	17,308	16,622	21,904
Stoddard	17,784	171,814	2,547	2,608	25,625	26,463
Stone	11,400	136,921	3,110	55,938	13,123	22,820
Sullivan	51,851	714,514	10,334	11,835	18,902	54,652
Taney	15,454	167,560	5,237	7,365	10,483	15,976
Texas	21,513	244,094	18,357	27,382	24,934	35,765
Vernon	39,535	566,395	2,050	2,471	23,955	68,239
Warren	9,407	97,260	2,224	2,465	13,140	20,750
Washington	12,006	116,567	2,535	2,889	9,984	13,729
Wayne	16,905	180,415	3,182	4,531	18,480	28,345
Webster	17,618	175,814	13,811	20,080	19,128	34,135
Worth	20,484	319,725	3,046	4,521	14,021	82,050
Wright	15,615	188,148	17,770	27,250	19,587	32,850

MISSOURI COUNTIES.

Average number of cattle, horses, mules, sheep and swine per square mile in each county; also total average value of all live stock per square mile.

County.	Average number per square mile in each county.					Total average value per square mile.
	Cattle.	Horses.	Mules.	Sheep.	Swine.	
Adair	64	21	2	11	64	$4,119
Andrew	102	27	5	11	189	7,418
Atchison	94	21	7	6	214	7,105
Audrain	58	19	7	49	75	4,559
Barry	24	10	3	10	35	1,829
Barton	50	17	4	9	44	3,202
Bates	55	20	5	7	96	4,488
Benton	38	12	3	15	38	2,318
Bollinger	21	8	3	14	48	1,678
Boone	53	18	8	29	75	4,357
Buchanan	67	22	7	8	114	5,324
Butler	13	5	2	2	29	958
Caldwell	87	26	4	62	158	6,606
Callaway	43	17	8	53	63	3,935
Camden	21	7	2	15	31	1,467
Cape Girardeau	29	13	6	17	66	2,592
Carroll	57	21	8	14	114	5,006
Carter	9	2	1	1	23	640
Cass	60	21	5	13	125	5,040
Cedar	40	17	4	10	61	3,037
Chariton	64	20	7	13	74	4,537
Christian	29	11	3	11	50	2,129
Clark	64	22	3	20	74	4,516
Clay	83	22	5	37	187	6,504
Clinton	98	24	5	16	170	6,914
Cole	32	12	3	14	51	2,570
Cooper	53	16	9	21	102	4,611
Crawford	22	6	3	12	29	1,385
Dade	42	16	5	8	60	3,126
Dallas	27	12	3	18	40	2,054
Daviess	78	25	5	27	127	5,923
DeKalb	89	24	4	10	142	6,293
Dent	21	6	2	11	27	1,288
Douglas	16	7	2	14	33	1,310
Dunklin	26	9	6	1	78	2,298
Franklin	29	10	4	9	56	2,292
Gasconade	29	8	5	14	40	2,070
Gentry	101	29	3	42	153	7,136
Greene	37	17	4	8	49	3,099
Grundy	74	22	3	26	82	5,034
Harrison	88	25	3	22	27	5,780
Henry	50	17	5	5	74	3,874
Hickory	35	12	2	14	49	2,408
Holt	64	20	6	9	214	6,042
Howard	58	18	10	26	92	4,777
Howell	17	7	2	11	31	1,320
Iron	16	3	1	5	15	774
Jackson	80	23	6	28	118	5,819
Jasper	35	17	3	5	35	2,597
Jefferson	33	9	4	7	37	2,030
Johnson	52	19	6	14	82	4,264
Knox	67	22	4	29	96	5,004
Laclede	23	9	2	14	34	1,657
Lafayette	62	21	8	14	125	5,335
Lawrence	32	16	6	7	43	2,809
Lewis	56	19	4	32	74	4,192

MISSOURI COUNTIES—Continued.

County.	Average number per square mile in each county.					Total average value per square mile.
	Cattle.	Horses.	Mules.	Sheep.	Swine.	
Lincoln	43	17	3	18	81	$3,608
Linn	88	21	3	24	64	5,136
Livingston	71	22	3	21	105	5,166
McDonald	17	8	2	11	40	1,483
Macon	59	19	5	20	52	4,130
Madison	18	5	2	10	28	1,148
Maries	24	8	4	14	41	1,734
Marion	47	20	5	39	75	4,103
Mercer	95	22	3	11	82	5,606
Miller	28	9	2	19	41	1,947
Mississippi	21	5	7	1	51	1,776
Moniteau	47	16	7	15	69	3,519
Monroe	59	22	8	75	76	4,919
Montgomery	42	14	5	22	74	3,112
Morgan	32	9	4	17	31	2,132
New Madrid	13	4	5	1	35	1,208
Newton	27	13	3	1	24	1,957
Nodaway	106	28	3	6	206	7,697
Oregon	14	5	2	6	32	1,090
Osage	29	7	6	13	41	2,080
Ozark	20	5	2	9	28	1,200
Pemiscot	19	4	5	1	31	1,314
Perry	26	10	6	18	65	2,345
Pettis	58	18	6	9	68	4,169
Phelps	23	7	2	13	31	1,487
Pike	53	19	5	34	71	4,225
Platte	63	22	7	17	152	5,621
Polk	37	20	4	20	51	3,160
Pulaski	23	7	2	17	39	1,563
Putnam	80	23	2	25	53	4,895
Ralls	56	18	4	11	65	3,328
Randolph	63	20	6	42	53	4,447
Ray	66	21	8	11	145	5,624
Reynolds	15	3	2	6	25	848
Ripley	14	5	2	6	33	1,143
St. Charles	33	14	5	8	71	3,173
St. Clair	40	14	2	7	48	2,822
Ste. Genevieve	23	8	2	8	47	1,683
St. Francois	32	8	3	9	32	1,843
St. Louis	25	17	8	4	46	3,021
Saline	65	19	9	6	120	5,293
Schuyler	66	21	3	81	71	4,687
Scotland	78	25	1	33	87	5,404
Scott	25	7	8	2	54	2,075
Shannon	9	3	1	2	19	623
Shelby	57	22	7	46	78	4,721
Stoddard	19	8	4	3	47	1,668
Stone	21	8	2	9	36	1,512
Sullivan	96	22	3	23	46	5,284
Taney	23	6	1	9	33	1,362
Texas	16	7	2	16	28	1,267
Vernon	48	18	4	7	60	3,667
Warren	27	9	4	9	44	2,200
Washington	20	5	2	8	26	1,197
Wayne	18	3	2	5	34	1,061
Webster	23	10	3	21	33	1,823
Worth	89	27	3	33	138	6,408
Wright	19	8	2	24	29	1,453

MISSOURI COUNTIES.

Table showing number of apple trees, number peach trees and value of annu forest products per square mile in Missouri.

County.	No. of apple trees per square mile	No. peach trees per square mile	Value of forest products per square mile.
Adair	214.80	28.07	$80 40
Andrew	959.60	119.14	157 00
Atchison	399.5	120.75	63 93
Audrain	98.11	12.71	20 77
Barry	467.14	79.28	70 73
Barton	351.46	15.12	8 19
Bates	224.42	26.40	24 30
Benton	90.32	34.20	70 11
Bollinger	211.60	102.60	79 82
Boone	289.18	33.73	94 11
Buchanan	864.35	109.94	116 14
Butler	102.98	47.31	57 01
Caldwell	220.82	36.21	53 40
Callaway	217.50	35.68	100 40
Camden	191.26	48.91	90 81
Cape Girardeau	233.0	51.42	155 94
Carroll	378.42	52.87	45 08
Carter	90.37	29.23	23 49
Cass	174.73	38.57	33 43
Cedar	349.55	42.85	58 90
Chariton	315.17	36.47	60 75
Christian	352.71	40.97	71 21
Clark	137.13	30.57	86 90
Clay	359.15	64.84	56 47
Clinton	27	42.37	122 37
Cole	179.43	48.35	120 98
Cooper	331.43	30.75	82 75
Crawford	514.64	46.73	51 12
Dade	362.08	14.95	22 10
Dallas	280:80	49.75	57 98
Daviess	323.11	67.22	105 33
DeKalb	256.70	32.37	43 89
Dent	44.34	51.05	55 90
Douglas	356.16	137.97	39 00
Dunklin	75.73	34.93	38 16
Franklin	224.21	76.40	123 20
Gasconade	168.70	39.78	98 57
Gentry	430.71	69.52	139 11
Greene	784.43	50.41	84 42
Grundy	346.18	38.73	92 36
Harrison	240.78	42.11	90 43
Henry	153.71	29.14	51 08
Hickory	138.42	37.96	50 14
Holt	762.61	10.92	76 12
Howard	309.25	40.81	133 04
Howell	878.98	595.94	40 94
Iron	69.03	18.98	20 44
Jackson	651.14	108.39	527 75
Jasper	428.28	22.13	51 85
Jefferson	289.68	161.38	80 59
Johnson	240.27	5..22	59 03
Knox	152.96	47.96	96 16
Laclede	387.78	36.34	30 83
Lafayette	524.40	42.83	61 51
Lawrence	355.11	25.94	115 44
Lewis	101.24	23.52	64 52

MISSOURI COUUTIES—Continued.

County	No. of apple trees per square mile	No. peach trees per square mile.	Value of forest products per square mile.
Lincoln	171.93	19.33	78 36
Linn	329.04	42.6	73 23
Livingston	65.9	56.82	76 40
Mc Donald	495.94	87.53	79 73
Macon	391.49	34.62	81 19
Madison	92.6	19.43	86 26
Maries	112.03	35.72	59 67
Marion	154.72	50.75	181 02
Mercer	508.26	90.50	141 83
Miller	186.42	38.94	32 91
Mississippi	29.73	9.24	47 06
Moniteau	248.48	57.77	99 28
Monroe	170.67	25.57	47 57
Montgomery	133.45	16.09	46 30
Morgan	110.95	29.60	71 12
New Madrid	15.79	5.24	22 68
Newton	518.16	34.51	66 11
Nodaway	329.84	93.85	65 89
Oregon	205.24	212.66	50 84
Osage	115.63	31.83	66 21
Ozark	74.55	49.99	13 89
Pemiscot	19.59	9.36	53 81
Perry	196.70	86.07	133 00
Pettis	267.72	47.20	54 44
Phelps	182.62	22.68	53 27
Pike	292.78	55.59	93 72
Platte	825.77	53.36	1 82
Polk	399.57	34.85	44 10
Pulaski	332.16	60.44	33 04
Putnam	261.54	45.78	47 23
Ralls	256.46	37.88	61 16
Randolph	210.71	27.77	85 72
Ray	275.41	39	52 50
Reynolds	73.98	11.21	19 73
Ripley	110.5	47.58	42 16
St. Charles	241.08	30.79	87 06
St. Clair	184.05	26.83	49 16
Ste. Genevieve	115.02	74.43	59 04
St. Francois	191.15	46.32	102 68
St. Louis	564.41	962.04	71 66
Saline	298.28	51.14	62 31
Schuyler	144.26	33.21	39 96
Scotland	155.17	51.68	62 21
Scott	42.58	18.39	61 10
Shannon	131.82	33.17	28 80
Shelby	150.99	60.3	82 21
Stoddard	73.53	45.94	80 56
Stone	161.44	87.06	42 80
Sullivan	213.92	26.57	74 28
Taney	53.98	64.52	22 02
Texas	420.53	140.40	40 51
Vernon	454.42	17.16	25 13
Warren	185.45	41.97	99 36
Washington	94.73	23.35	37 04
Wayne	134.94	48.58	34 50
Webster	913.58	84.62	50 96
Worth	288.38	62	152 58
Wright	642.24	210.21	49 35

CORN CROP OF THE UNITED STATES—1904.

(From monthly crop report U. S. Department of Agriculture.)

States and Territories.	Corn.				
	Acreage.	Yield per acre.	Production.	Price per bu.	Total farm value.
	Acres.	Bu.	Bushels.	Cents.	
Maine	12,871	39.7	510,979	81	$413,893
New Hampshire	27,597	27.3	753,398	72	542,447
Vermont	59,427	35.9	2,133,429	73	1,557,403
Massachusetts	44,355	36.0	1,596,780	72	1,149,682
Rhode Island	9,912	34.1	337,999	84	283,919
Connecticut	54,505	38.9	2,120,244	73	1,547,778
New York	625,615	27.3	17,079,290	64	10,930,746
New Jersey	274,999	38.0	10,449,962	58	6,060,978
Pennsylvania	1,427,522	34.0	48,535,748	59	28,636,091
Delaware	197,116	30.4	5,688,326	49	2,787,280
Maryland	635,146	33.4	21,213,876	50	10,606,938
Virginia	1,841,198	23.3	42,899,913	59	25,310,949
North Carolina	2,677,992	15.2	40,705,478	62	25,237,396
South Carolina	1,789,503	12.4	22,189,837	70	15,532,886
Georgia	3,977,707	11.9	47,334,713	71	33,607,646
Florida	620,592	10.7	6,640,334	75	4,980,250
Alabama	2,791,811	15.0	41,877,165	60	25,126,299
Mississippi	2,079,040	19.1	39,709,664	56	22,237,412
Louisiana	1,369,771	19.9	27,258,443	57	15,537,313
Texas	6,048,792	22.6	136,702,699	52	71,085,403
Arkansas	2,237,621	21.6	48,332,614	53	25,616,285
Tennessee	3,235,601	25.0	80,890,025	50	40,445,012
West Virginia	757,961	25.3	19,176,413	64	12,272,904
Kentucky	3,227,345	26.9	86,815,580	49	42,539,634
Ohio	3,065,494	32.5	99,628,555	46	45,829,135
Michigan	1,293,373	28.6	36,990,468	52	19,235,043
Indiana	4,552,281	31.5	143,396,852	41	57,792,709
Illinois	9,428,320	36.5	344,133,680	39	134,212,135
Wisconsin	1,519,189	29.7	45,119,913	46	20,755,160
Minnesota	1,554,241	26.9	41,809,083	36	15,051,270
Iowa	9,295,683	32.6	303,039,266	33	100,002,958
Missouri	5,783,307	26.2	151,522,643	44	66,669,963
Kansas	6,440,654	20.9	134,609,669	41	55,189,964
Nebraska	7,955,559	32.8	260,942,335	33	86,110,971
South Dakota	1,560,678	28.1	43,855,052	36	15,787,819
North Dakota	90,308	21.2	1,914,530	40	765,812
Montana	3,902	22.2	86,624	68	58,904
Wyoming	2,218	32.5	72,085	57	41,088
Colorado	117,837	20.5	2,415,658	54	1,304,455
New Mexico	34,281	22.7	778,179	78	606,980
Arizona	6,091	23.8	144,966	91	131,919
Utah	11,468	33.2	380,738	72	274,131
Nevada	.....	.....	.....	.....	.....
Idaho	5,346	29.3	156,638	70	109,647
Washington	9,815	24.7	242,430	66	160,004
Oregon	17,212	28.8	495,706	61	302,381
California	54,415	28.6	1,556,269	78	1,213,890
Oklahoma	1,729,953	28.1	48,611,679	39	18,958,555
Indian Territory	1,685,957	32.4	54,625,007	40	21,850,003
United States	92,231,581	26.8	2,467,480,934	44.1	$1,087,461,440

NOTE—The acreage for corn in Missouri as given in the above report differs considerably from the acreage in cultivation as shown by the report of the Board of Agriculture. While the reports of the Board of Agriculture and the United States Department of Agriculture on the acreage and production of crops in Missouri usually agree very closely, we are inclined to think that the wide difference in corn acreage is perhaps accounted for by the fact that the U. S. Department has failed to take into account the increased acreage in this State on account of the new lands that have been brought into cultivation during the last ten years. The figures for Missouri as shown by the State Board of Agriculture are:

Acreage.	Yield.	Production.	Price.	Value.
6,646,790	26.2	173,867,460	$0.42	$73,476,280

CORN CROP OF COUNTRIES NAMED, 1900-1903.

(As reported by the Department of Agriculture, 1904.)

Countries.	1900.	1901.	1902.	1903.
	Bushels.	Bushels.	Bushels.	Bushels.
United States	2,105,103,000	1,522,520,000	2,523,648,000	2,244,177,000
Canada (Ontario)	27,947,000	25,621,000	21,159,000	30,211,000
Mexico	92,204,000	93,459,000	78,099,000	90,000,000
Total North America	2,225,254,000	1,641,600,000	2,622,906,000	2,364,388,000
Chili	8,000,000	9,000,000	9,000,000	9,000,000
Argentine	55,612,000	98,842,000	84,018,000	148,422,000
Uruguay	3,035,000	5,576,000	5,060,000	5,289,000
Total South America	66,647,000	113,418,000	98,078,000	162,711,000
France	22,232,000	26,393,000	24,928,000	25,000,000
Spain	26,016,000	25,759,000	25,272,000	18,759,000
Portugal	16,000,000	15,000,000	16,000,000	14,000,000
Italy	83,286,000	100,455,000	71,028,000	88,990,000
Austria	15,446,000	17,535,000	13,462,000	16,056,000
Hungary	127,656,000	127,389,000	104,546,000	135,748,000
Croatia-Slavonia	18,691,000	20,469,000	15,255,000	23,918,000
Total Austria-Hungary	161,793,000	165,393,000	133,263,000	175,722,000
Roumania	85,047,000	116,945,000	68,447,000	80,272,000
Bulgaria and E. Roumelia	18,000,000	25,000,000	18,109,000	20,000,000
Servia	18,472,000	18,849,000	18,396,000	19,479,000
Russia	34,256,000	68,400,000	48,647,000	50,732,000
Total Europe	465,102,000	562,194,000	424,090,000	492,954,000
Algeria	350,000	350,000	350,000	350,000
Egypt	25,000,000	30,000,000	30,000,000	30,000,000
Cape Colony	2,000,000	2,000,000	2,000,000	2,000,000
Total Africa	27,350,000	32,350,000	32,350,000	32,350,000
Australasia	10,025,000	10,168,000	7,847,000	5,615,000

RECAPITULATION BY CONTINENTS.

North America	2,225,254,000	1,641,600,000	2,622,906,000	2,364,388,000
South America	66,647,000	113,418,000	98,078,000	162,711,000
Europe	465,102,000	562,194,000	424,090,000	492,954,000
Africa	27,350,000	32,350,000	32,350,000	32,350,000
Australasia	10,025,000	10,168,000	7,847,000	5,615,000
Total	2,794,378,000	2,359,730,000	3,185,271,000	3,058,018,000

ACREAGE, PRODUCTION AND VALUE OF THE WHEAT CROP OF THE UNITED STATES IN 1904.

(As reported by the Department of Agriculture, Washington, D. C.)

States and Territories.	Winter and Spring Wheat.				
	Acreage.	Yield per acre.	Production.	Price per bu.	Total farm value.
	Acres.	Bu.	Bushels.	Cents.	Dollars.
Maine	†7,725	23.3	179,992	104	$187,192
Vermont	†1,606	25.1	40,311	113	45,551
New York	*474,572	11.3	5,362,664	109	5,845,304
New Jersey	*104,673	13.3	1,392,151	110	1,531,366
Pennsylvania	*1,550,210	14.1	21,857,961	108	23,606,598
Delaware	*112,537	14.9	1,676,801	108	1,810,945
Maryland	*770,710	13.4	10,327,514	106	10,947,165
Virginia	*711,477	10.2	7,257,065	109	7,910,201
North Carolina	*571,228	8.6	4,912,561	119	5,845,948
South Carolina	*279,926	8.1	2,267,401	126	2,856,925
Georgia	*291,370	8.8	2,564,056	126	3,230,711
Alabama	*102,926	10.3	1,060,138	115	1,219,159
Mississippi	*2,909	8.8	25,599	101	25,855
Texas	*1,166,688	10.7	12,483,562	110	13,731,918
Arkansas	*217,674	10.1	2,198,507	101	2,220,492
Tennessee	*808,558	11.5	9,298,417	111	10,321,243
West Virginia	*312,755	10.1	3,158,826	109	3,443,120
Kentucky	*644,678	11.4	7,349,329	109	8,010,769
Ohio	*1,527,259	11.5	17,563,478	110	19,319,826
Michigan	*701,327	9.8	6,873,005	108	7,422,845
Indiana	*1,361,521	9.2	12,525,993	106	13,277,553
Illinois	*1,561,045	13.8	21,542,421	101	21,757,845
Wisconsin	*115,543	17.7	2,045,111	98	2,004,209
	†367,463	14.8	5,438,452	98	5,329,683
Minnesota	†5,339,395	12.8	68,344,256	87	59,459,503
Iowa	*55,944	15.6	872,726	90	785,453
	†911,710	11.4	10,393,494	90	9,354,145
Missouri	*2,321,636	11.7	27,163,141	96	26,076,615
Kansas	*4,989,621	12.3	61,372,338	89	54,621,381
	†241,532	15.1	3,647,133	89	3,245,948
Nebraska	*1,880,394	14.4	27,077,674	87	23,557,576
	†433,294	10.1	4,376,269	87	3,807,354
South Dakota	†3,287,165	9.6	31,556,784	79	24,929,859
North Dakota	†4,567,135	11.8	53,892,193	81	43,652,676
Montana	†108,608	23.9	2,596,731	80	2,311,091
Wyoming	†23,574	22.1	520,985	90	468,886
Colorado	†259,546	22.8	5,917,649	91	5,385,061
New Mexico	†34,428	12.8	440,678	106	467,119
Arizona	†13,964	25.5	356,082	113	402,373
Utah	†180,219	26.6	4,793,825	86	4,122,690
Nevada	†25,283	26.2	662,415	92	609,422
Idaho	*154,919	22.3	3,454,694	80	2,763,755
	†143,137	23.6	3,378,033	80	2,702,426
Washington	*521,451	28.1	14,652,773	80	11,722,218
	†925,282	18.9	17,487,830	80	13,990,264
Oregon	*402,296	21.4	8,609,134	81	6,973,399
	†337,954	16.1	5,441,059	81	4,407,258
California	*1,618,043	10.8	17,474,864	88	15,377,880
Oklahoma	*1,285,527	11.7	15,040,666	93	13,987,819
Indian Territory	*246,438	14.1	3,474,776	98	3,405,280
Total winter	26,865,855	12.4	332,935,346	97.8	$325,611,373
Total spring	17,209,020	12.8	219,464,171	84.2	184,878,501
Grand total	44,074,875	....	552,399,517	....	$510,489,874

*Winter wheat. †Spring wheat

THE WORLD'S WHEAT CROP. (In Quarters.)

(From Trade and Commerce, St. Louis, 1904.)

Official returns are taken when obtainable, excepting in the case of the U. S. A., where recognized commercial estimates are adopted in preference. The returns represent the crops harvested in July and August of the years named, excepting in the cases of Argentina, Uruguay, Australasia, and the Cape, which are harvested fifteen weeks subsequently; and in the same cases of Chili and India somewhat later. For the current year forecasts only can be given for these last six. A quarter equals ⅛ of a bushel.

Countries.	1904.	1903.	1902.	1901.
Europe—				
France	37,200,000	45,400,000	44,000,000	38,900,000
Russia proper	....	....	....	40,000,000
Poland	64,000,000	77,000,000	a 76,000,000	1,800,000
Cis-Caucasia	....	....	....	8,400,000
Hungary	17,000,000	20,200,000	21,300,000	15,400,000
Austria	4,700,000	5,700,000	6,000,000	5,200,000
Croatia and Sclavonia	1,300,000	1,800,000	1,500,000	1,300,000
Herzogovinia and Bosnia	250,000	300,000	350,000	300,000
Italy	16,000,000	22,400,000	d 16,500,000	d 20,000,000
Germany	18,000,000	16,330,000	17,900,000	11,500,000
Spain	e 11,000,000	e 13,000,000	e 14,000,000	13,500,000
Portugal	500,000	1,000,000	1,300,000	1,300,000
Roumania	6,300,000	8,950,000	9,200,000	8,800,000
Bulgaria	....	....	....	3,000,000
Eastern Roumelia	6,500,000	7,000,000	f 5,500,000	800,000
Servia	1,000,000	1,300,000	1,500,000	1,100,000
Turkey—in Europe	2,000,000	2,500,000	2,500,000	2,000,000
Greece	500,000	800,000	400,000	400,000
United Kingdom	5,000,000	6,100,000	7,300,000	6,700,000
Belgium	1,400,000	1,600,000	1,600,000	1,700,000
Holland	700,000	800,000	900,000	600,000
Switzerland	500,000	500,000	500,000	550,000
Sweden	800,000	673,000	563,000	550,000
Denmark	450,000	500,000	550,000	300,000
Norway	40,000	40,000	40,000	50,000
Cypress, Malta, etc	200,000	200,000	250,000	250,000
Total Europe	195,340,000	234,093,000	229,653,000	184,400,000
America—				
United States	† 66,000,000	† 71,000,000	† 85,000,000	† 94,000,000
Canada	10,500,000	9,800,000	11,700,000	10,600,000
Mexico	2,000,000	2,000,000	2,000,000	2,000,000
Argentina	h 18,000,000	17,000,000	b 13,000,000	7,000,000
Chili	h 1,700,000	1,700,000	1,700,000	1,400,000
Uruguay	h 1,300,000	700,000	1,000,000	700,000
Total America	99,500,000	102,200,000	114,400,000	115,700,000
Asia—				
India	h 44,000,000	44,000,000	c 36,500,000	28,500,000
Turkey—in Asia	4,000,000	4,000,000	3,500,000	3,500,000
Persia	2,000,000	2,000,000	1,700,000	1,900,000
Japan	2,200,000	2,000,000	2,000,000	2,000,000
Total Asia	52,200,000	52,000,000	43,700,000	35,900,000
Africa—				
Algeria	4,400,000	g 4,300,000	4,236,000	4,443,000
Tunis	1,200,000	900,000	1,000,000	800,000
Egypt	1,100,000	1,000,000	1,000,000	1,100,000
The Cape	600,000	500,000	500,000	500,000
Total Africa	7,300,000	6,700,000	6,736,000	6,843,000

THE WORLD'S WHEAT CROP—Continued.

Australasia—				
Victoria	*h* 2,100,000	3,600,000	320,000	1,500,000
South Australia	1,300,000	1,600,000	800,000	1,000,000
New South Wales	2,500,000	3,400,000	200,000	1,800,000
Tasmania	100,000	100,000	100,000	120,000
West Australia	200,000	230,000	100,000	110,000
Queens Land	200,000	300,000	1,000	100,000
New Zealand	*h* 900,000	1,000,000	900,000	500,000
Total Australasia	7,300,000	10,230,000	2,421,000	5,130,000
World's Totals—				
Quarters	361,640,000	405,222,000	396,910,000	347,973,000
Bushels	2,893,120,000	3,241,784,000	3,175,280,000	2,783,784,000
Quintals	787,290,000	882,170,000	864,073,000	757,537,000
Hectolitres	1,048,756,000	1,175,146,000	1,157,039,000	1,009,121,000

NOTES—(*a*). Most recent estimate of Central Statistical Committee.
(*b*). Two million below the official estimate.
(*c*). Revised system.
(*d*). Revised October, 1903.
(*e*). Unofficial.
(*f*). Revised September, 1903.
(*g*). All former returns revised September, 1903.
(*h*). Growing crop.
(†). A conservative commercial estimate.

HARVEST TIME OF THE WORLD.

The following shows the months of the wheat harvest in the different wheat-growing sections of the world:

January—Australia, New Zealand, Chili, and Argentine Republic.

February, March—East India and Upper Egypt.

April—Lower Egypt, Syria, Cypress, Persia, Asia Minor, India, Mexico and Cuba.

May—Algeria, Central Asia, China, Japan, Morocco, Texas and Florida.

June—Turkey, Greece, Italy, Spain, Portugal, South of France, California, Oregon, Louisiana, Mississippi, Alabama, Georgia, Carolina, Tennessee, Virginia, Kentucky, Kansas, Arkansas, Utah, Colorado and Missouri.

July—Roumania, Bulgaria, Austria-Hungary, South of Russia, Germany, Switzerland, France, South of England, Nebraska, Minnesota, Wisconsin, Iowa, Illinois, Indiana, Michigan, Pennsylvania, Ohio, New York, New England and Upper Canada.

August—Belgium, Holland, Great Britain, Denmark, Poland, Lower Canada, Columbia, Manitoba, and Dakota.

September and October—Scotland, Sweden, Norway and North of Russia.

November—Peru and South Africa.

December—Burmah.

ACREAGE, PRODUCTION AND VALUE OF THE HAY CROP OF THE UNITED STATES IN 1904.

(As reported by the Department of Agriculture, Washington, D. C.)

States and Territories.	Acreage.	Yield per acre.	Production	Price per ton.	Total farm value.
	Acres.	Tons	Tons.		
Maine	1,290,852	1.10	1,419,937	$9 72	$13,801,788
New Hampshire	625,788	1.02	638,304	13 49	8,610,721
Vermont	870,617	1.25	1,088,271	9 48	10,316,809
Massachusetts	582,890	1.23	716,955	15 76	11,299,211
Rhode Island	65,242	1.16	75,681	17 38	1,315,336
Connecticut	484,751	1.06	513,836	14 89	7,651,018
New York	4,765,294	1.36	6,480,800	10 44	67,659,552
New Jersey	424,568	1.39	590,150	14 67	8,657,500
Pennsylavania	3,103,052	1.45	4,499,425	11 82	53,183,204
Delaware	77,091	1.59	122,575	13 89	1,702,567
Maryland	301,064	1.36	409,447	12 48	5,109,899
Virginia	458,820	1.39	637,760	12 55	8,003,888
North Carolina	128,197	1.72	220,499	14 56	3,210,465
South Carolina	60,706	1.53	92,880	12 18	1,131,278
Georgia	89,851	1.52	136,574	15 14	2,067,730
Florida	12,499	1.36	16,999	16 67	283,373
Alabama	56,372	1.71	96,396	12 13	1,169,283
Mississippi	45,277	1.72	77,876	10 85	844,955
Louisiana	21,488	2.06	44,265	12 10	540,033
Texas	407,900	1.77	721,983	8 12	5,862,502
Arkansas	78,595	1.72	135,183	9 82	1,327,497
Tennessee	349,944	1.66	580,907	12 01	6,976,693
West Virginia	533,276	1.47	783,916	12 41	9,728,398
Kentucky	485,298	1.44	698,826	11 51	8,043,522
Ohio	2,713,453	1.43	3,880,238	9 25	35,892,202
Michigan	2,126,883	1.25	2,658,604	9 09	24,166,710
Indiana	1,751,155	1.37	2,399,082	8 58	20,584,124
Illinois	2,747,095	1.36	3,736,049	8 66	32,354,184
Wisconsin	1,772,271	1.67	2,959,693	7 89	23,351,978
Minnesota	867,136	1.74	1,508,817	5 51	8,313,582
Iowa	3,132,322	1.62	5,074,362	5 36	27,198,580
Missouri	2,992,267	1.47	4,398,632	6 62	29,118,944
Kansas	1,795,246	1.67	2,998,061	4 38	13,131,507
Nebraska	578,821	1.76	1,018,725	3 82	3,891,530
South Dakota	202,768	1.43	289,958	4 24	1,229,422
North Dakota	156,410	1.57	245,564	4 21	1,033,824
Montana	348,980	1.92	670,042	8 70	5,829,365
Wyoming	176,501	2.27	400,657	5 75	2,303,778
Colorado	671,945	1.85	1,243,098	6 71	8,341,188
New Mexico	71,897	2.58	185,494	11 42	2,118,341
Arizona	60,652	2.71	164,367	14 84	2,439,206
Utah	354,820	3.54	1,256,063	6 31	7,925,758
Nevada	159,042	3.04	483,488	7 60	3,674,509
Idaho	374,968	3.07	1,151,152	6 08	6,999,004
Washington	325,705	2.18	710,037	11 34	8,051,820
Oregon	378,715	2.04	772,579	10 18	7,864,854
California	583,286	2.03	1,184,071	10 41	12,326,799
Oklahoma	293,337	1.51	442,939	4 90	2,170,401
Indian Territory	43,495	1.49	64,808	4 62	299,413
United States	39,998,602	1.52	60,696,028	$8 72	$529,107,625

ACREAGE, PRODUCTION AND VALUE OF THE OAT CROP OF THE UNITED STATES IN 1904.

(As reported by the Department of Agriculture, Washington, D. C.)

States and Territories.	Acreage.	Yield per acre.	Production.	Price per bushel	Total farm value.
	Acres.	Bush.	Bushels.	Cents.	Dollars.
Maine	113,957	36.6	4,170,826	45	$1,876,872
New Hampshire	12,174	33.2	404,177	47	189,963
Vermont	80,129	37.9	3,036,889	44	1,336,231
Massachusetts	6,637	34.0	225,658	45	101,546
Rhode Island	1,604	25.4	40,742	47	19,149
Connecticut	10,077	33.5	337,580	44	148,535
New York	1,245,752	34.1	42,480,143	38	16,142,454
New Jersey	63,143	32.5	2,052,148	40	820,859
Pennsylvania	1,172,915	33.9	39,761,818	38	15,109,491
Delaware	4,341	28.2	122,416	41	50,191
Maryland	35,656	29.7	1,058,983	36	381,234
Virginia	183,811	21.1	3,878,412	43	1,667,717
North Carolina	205,874	15.8	3,252,809	52	1,691,461
South Carolina	191,336	17.1	3,271,846	60	1,963,108
Georgia	235,606	14.8	3,486,969	55	1,917,833
Florida	32,562	12.9	420,050	60	252,030
Alabama	197,787	14.9	2,947,026	54	1,591,394
Mississippi	101,544	19.2	1,949,645	52	1,013,815
Louisiana	31,494	18.4	579,490	45	260,770
Texas	896,510	32.0	28,688,320	44	12,622,861
Arkansas	211,276	22.7	4,795,965	43	2,062,265
Tennessee	155,779	21.1	3,286,937	37	1,216,167
West Virginia	85,606	26.4	2,259,998	44	994,399
Kentucky	228,553	24.0	5,485,272	40	2,194,109
Ohio	1,215,979	40.9	49,733,541	32	15,914,733
Michigan	990,002	32.5	32,175,065	33	10,617,771
Indiana	1,279,720	33.1	42,358,732	30	12,707,620
Illinois	3,666,936	32.0	117,341,952	30	35,202,586
Wisconsin	2,478,129	35.0	86,734,515	28	24,285,664
Minnesota	2,172,921	39.2	85,178,503	26	22,146,411
Iowa	3,822,600	32.0	122,323,200	25	30,580,800
Missouri	716,544	22.7	16,265,549	34	5,530,287
Kansas	952,533	17.8	16,955,087	33	5,595,179
Nebraska	1,886,270	30.7	57,908,489	29	14,477,122
South Dakota	713,468	39.0	27,825,252	25	6,956,313
North Dakota	829,151	37.4	31,010,260	24	7,442,486
Montana	167,207	37.7	6,303,704	46	2,899,704
Wyoming	41,787	30.2	1,261,967	39	492,167
Colorado	136,563	35.4	4,834,330	46	2,223,792
New Mexico	9,927	19.6	194,569	57	110,904
Arizona	999	30.1	30,070	74	22,252
Utah	44,966	37.6	1,690,722	47	794,639
Nevada	6,267	37.0	231,879	63	146,084
Idaho	92,778	39.3	3,646,175	50	1,823,088
Washington	164,971	44.9	7,407,198	43	3,185,095
Oregon	281,842	23.1	6,510,550	47	3,059,958
California	167,084	34.1	5,697,564	57	3,247,611
Oklahoma	283,117	21.2	6,002,080	36	2,160,749
Indian Territory	216,782	32.2	6,980,380	38	2,652,544
United States	27,842,669	32.1	894,595,552	31.3	$279,900,013

ACREAGE, PRODUCTION AND VALUE OF THE POTATO CROP OF THE UNITED STATES IN 1904.

(As reported by the Department of Agriculture, Washington, D. C.)

States and Territories.	Acreage.	Yield per acre.	Production.	Price per bushel	Total farm value.
	Acres.	Bush.	Bushels.	Cents.	Dollars.
Maine	91,431	215	19,657,665	48	$9,435,679
New Hampshire	19,922	135	2,689,479	56	1,506,103
Vermont	27,388	128	3,505,664	47	1,647,662
Massachusetts	29,740	119	3,539,060	71	2,512,733
Rhode Island	6,832	137	935,984	76	711,348
Connecticut	32,254	96	3,096,384	72	2,229,395
New York	442,254	93	41,129,622	54	22,209,996
New Jersey	62,876	115	7,230,740	61	4,410,751
Pennsylvania	256,261	106	27,174,266	54	14,674,104
Delaware	7,601	84	638,484	53	338,397
Maryland	29,939	99	2,963,961	51	1,511,620
Virginia	52,986	83	4,397,838	55	2,418,811
North Carolina	25,627	78	1,998,906	70	1,399,234
South Carolina	8,726	88	767,888	101	775,567
Georgia	8,542	70	597,940	107	639,796
Florida	3,454	102	352,308	129	454,477
Alabama	9,450	61	576,450	99	570,686
Mississippi	5,748	82	471,336	85	400,636
Louisiana	8,710	70	609,700	91	554,827
Texas	31,196	72	2,246,112	93	2,088,884
Arkansas	22,612	77	1,741,124	75	1,305,843
Tennessee	24,583	71	1,745,393	62	1,082,144
West Virginian	34,036	101	3,434,636	54	1,856,323
Kentucky	35,803	83	2,971,649	55	1,634,407
Ohio	163,566	98	16,029,468	47	7,533,580
Michigan	262,865	121	31,806,665	29	9,223,933
Indiana	80,225	93	7,460,925	45	3,357,416
Illinois	147,670	108	15,948,360	47	7,495,729
Wisconsin	249,997	126	31,499,622	28	8,819,894
Minnesota	137,215	102	13,995,930	29	4,058,820
Iowa	164,368	136	22,354,048	28	6,259,133
Missouri	85,237	96	8,182,752	48	3,927,721
Kansas	69,257	80	5,540,560	56	3,102,714
Nebraska	85,435	120	10,252,200	26	2,665,572
South Dakota	33,086	96	3,176,256	30	952,877
North Dakota	24,926	111	2,766,786	32	885,372
Montana	13,162	143	1,882,166	61	1,148,121
Wyoming	3,848	161	619,528	62	394,107
Colorado	54,311	159	8,645,449	37	3,195,116
New Mexico	1,336	62	82,832	78	64,609
Utah	12,482	137	1,710,171	48	820,882
Nevada	2,724	131	356,844	65	231,949
Idaho	11,419	139	1,590,021	63	1,001,713
Washington	29,999	120	3,599,880	56	2,015,933
Oregon	37,489	87	3,261,543	59	1,924,310
California	47,001	129	6,063,129	67	4,062,296
Oklahoma	10,125	85	860,625	77	662,681
Indian Territory	9,840	69	678,960	75	509,220
United States	3,015,675	110.4	332,830,300	45.3	$150,673,392

WEEKLY PRICES OF LIVE STOCK FOR 1904.

(From Daily National Live Stock Reporter.)

Week Ending.	Cattle.		Hogs.			Sheep.	
	Best native steers.	Best southern steers.	Top.	Bulk.		Best lambs.	Best sheep.
Janu'y 2	$5 30	$3 75	$4 92½	$4 70	@ 4 80	$5 75	$3 75
9	5 35	4 45	5 05	4 67½	4 95	5 75	4 25
16	5 25	4 50	5 15	4 65	5 05	5 69	4 35
23	5 20	4 40	5 20	4 75	5 10	5 75	4 50
30	5 15	4 45	5 25	4 80	5 15	5 75	4 75
Febr'y 6	4 90	4 10	5 10	4 70	5 02½	5 85	4 75
13	5 35	4 35	5 40	5 00	5 32½	5 75	4 75
20	5 30	4 30	5 50	5 00	5 40	6 00	4 75
27	5 25	4 75	5 80	5 35	5 70	6 00	4 75
March 5	5 15	4 40	5 65	5 20	5 50	6 00	4 75
12	5 35	4 40	5 75	5 25	5 70	6 00	4 75
19	5 15	4 45	5 70	5 20	5 60	5 75	4 90
26	5 00	4 70	5 57½	5 20	5 50	5 75	4 75
April 2	5 25	4 35	5 67½	5 12½	5 62½	5 60	5 40
9	5 25	4 50	5 50	5 05	5 40	5 75	5 50
16	5 25	4 50	5 35	5 00	5 25	5 75	5 40
23	5 25	4 65	5 25	4 85	5 51	5 75	5 50
30	5 40	4 50	5 10	4 75	5 10	5 95	5 60
May 7	5 15	4 70	4 90	4 65	4 80	5 75	5 60
14	5 65	4 55	4 90	4 60	4 82½	5 75	5 50
21	5 50	4 55	4 90	4 55	4 85	5 75	5 50
28	5 35	4 75	4 85	4 55	4 75	6 10	5 65
June 4	5 75	5 00	4 82½	4 57½	4 72½	7 35	5 50
11	6 25	5 40	5 00	4 60	4 90	7 35	5 10
18	6 65	5 90	5 15	4 85	5 10	7 10	4 75
25	6 40	5 25	5 50	5 00	5 42½	7 35	4 60
July 2	6 25	4 70	5 50	5 15	5 40	6 25	4 60
9	6 20	4 50	5 60	5 30	5 52½	7 25	4 25
16	6 10	4 70	5 45	5 10	5 30	6 75	4 25
23	5 90	4 60	5 60	5 10	5 50	6 25	4 25
30	6 05	4 50	5 75	5 10	5 70	6 75	4 25
August 6	5 90	4 80	5 55	5 20	5 50	5 75	3 85
13	6 00	4 15	5 65	5 10	5 55	6 00	4 00
20	5 60	4 00	5 60	5 15	5 47½	5 25	3 75
27	5 85	3 90	5 72½	5 25	5 65	5 50	3 75
Sept. 3	5 75	3 60	5 70	5 30	5 65	5 50	3 75
10	5 90	3 75	5 95	5 50	5 87½	5 40	3 75
17	6 00	3 60	6 10	5 75	6 00	5 50	4 00
24	5 90	3 90	6 25	5 90	6 17½	5 75	4 00
October 1	6 05	3 60	6 30	5 82½	6 25	5 75	4 25
8	6 10	4 00	6 17½	5 80	6 07½	6 00	4 50
15	6 25	4 00	6 02½	5 25	6 00	5 50	4 10
22	6 60	4 20	5 50	4 90	5 30	5 75	4 15
29	6 25	4 05	5 50	4 95	5 40	6 00	4 25
Nov. 5	6 60	4 25	5 17½	4 85	5 12½	5 75	4 25
12	6 55	3 75	5 25	4 75	5 12½	6 00	4 65
19	6 50	3 70	4 92½	4 50	4 75	6 00	4 75
26	5 15	3 85	4 80	4 70	4 70	6 00	4 75
Dec. 3	5 85	4 10	4 70	4 40	4 62½	6 00	4 75
10	5 75	4 50	4 60	4 25	4 50	6 25	4 75
17	8 00	4 40	4 67½	4 40	4 62½	7 00	4 90
24	5 75	4 15	4 72½	4 37½	4 62½	6 60	4 75
31	5 80	4 10	4 85	4 50	4 75	7 00	4 85

MERCHANTS' EXCHANGE OF ST. LOUIS.

(Geo. H. Morgan, Secretary, St. Louis.)

The commercial organizations of the United States are important factors in the commercial life of the nation, being composed of active, progressive representatives of the various lines of trade in the community, they voice public sentiment and direct public thought in all matters pertaining to the public welfare. Many of these organizations are deliberative bodies, their purpose being to look after and develop and direct, as much as may be, the business interests of the special community in which they exist, while others are of a national character and look after matters which affect the country as a whole, while others are trading organizations where merchants and manufacturers meet to buy and sell and encourage business in their various lines.

To the latter class belongs the Merchants' Exchange of St. Louis, the largest commercial organization in the Louisiana Purchase and west of the Mississippi River. It is the legitimate successor of the St. Louis Chamber of Commerce, organized in 1836, and was the first exchange organized in this country for the purpose of trading. It is an active, progressive body of over 1,800 members, representing primarily the dealers in grain and other farm products, but including also in its membership every commercial, financial and manufacturing interest in the city, as well as many of the professions. It has on its roll of members ex-governors, ex-members of the cabinet, United States consuls, judges of the State and United States courts, lawyers, engineers and artists, the active members representing banks and trust companies, the grain trade, the packing and provision business, rail and river transportation, insurance and all jobbing trades in all its branches, as well as manufacturers in every line, but the principal business transacted on the floor is in grain and other products of the farm in the natural state and in the manufactured product.

It will thus be seen that this organization is representative in every sense and, therefore, is justly looked upon as the conservator of the commercial interests of the greatest city of the Mississippi Valley.

It publishes annually a statement of the trade and commerce of the city in all its branches, which is taken as authority by all statisticians and writers for the public press.

The Merchants' Exchange owns and occupies one of the most imposing and substantial business buildings in the city. It covers two-

thirds of a block, having a frontage of 233 feet by a depth of 187 feet. While externally a unit, it is in reality two distinct structures, one fronting on Third Street, designed for and occupied by business offices, the other the western portion of the building, in which is located a grand hall in which members meet daily from 9:00 a. m. to 1:15 p. m. for the transaction of business.

Centrally located as respects the whole country, St. Louis is the objective point of twenty-four lines of railrroads running in every direction, which, with the Mississippi River makes it the most accessible city and best distributing point in the Union.

As a grain market St. Louis holds third place among the great grain centers. It is the natural market for soft red winter wheat, which is distributed through the central West and more or less shipped to foreign countries.

The receipts during the past year were as follows:

Wheat, bushels	23,148,133
Corn, bushels	18,246,325
Oats, bushels	17,109,295
Rye, bushels	674,185
Barley, bushels	3,163,000
Hay, tons	270,695
Bran and shipstuffs, sacks	1,568,410
Bran aud shipstuffs, cars in bulk	669

St. Louis also is a large manufacturer of flour, the output in the city proper for the past year amounting to 1,102,980 barrels. In addition to this amount there were manufactured by mills outside of the city, but owned by members of the Merchants' Exchange, 2,212,781 barrels.

ANNUAL REPORT OF D. F. LUCKEY, STATE VETERINARIAN, FOR THE YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1903.						
Dec. 20	Telegram from Dr. Krumsey	1 mule	Chas. Schueler	Manchester, Mo	Malignant Odema	
1904.						
Jan. 15	Telegram	23 cattle, 50 sheep	A. C. Sox	Vandalia	Strongylus contortus	Advised treatment
Feb. 9	Letter	1 horse	J. F. Goran	4328 Vista Ave., St. Louis	Glanders	Died
16	Personal	1 mare	Frank George	2509 Denver Ave., Kansas City	Chronic glanders	Quarantined
16	Mr. Gentry	2 mares	Mrs. M. F. Ridgeway	Independence, Mo	" "	"
24	Dr. Knowles	1 mare	N. N. Hodges	"	" "	"
Mar. 3	Petition	5 cows	A. B. McGruder	Whiteside, Mo	Pneumonia	
3	"	35 goats, 50 sheep	A. A. Glassey	Cuba, Mo	Strongylosis	Advised treatment
9	Stock Yards Inspector	292 sheep	G. L. Johnson	Thomas Hill, Mo	Scabies	Quarantined
24		60 "	Edgar Summers	Clifton Hill, Mo	"	"
24	Petition	40 cows	Laughlin Bros	Mendon, Mo	Contagious abortion	Treated
26	Personal request	2 horses	W. F. Fidler	Clifton Hill, Mo	Strangles	"
April 14	Letter	1 horse	L. P. Robinson	Tower Grove Ave., Mo. Pac. track, St. Louis	Chronic glanders	Quarantined
16	Letter and telegram	3 cows	John W. Taylor	Huntsville, Mo	Pneumonia	Died
20	Letter from Dr. Sheldon	10 cattle	Bert Joiner	Trenton, Mo	Verminous bronchitis	Treated
22	B. A. I. Stock Yard Report	552 sheep	S. P. Craighead	Centralia, Mo	Scabies	Quarantined
26	Letter from Dr. R. A. Hume	3 horses	J. W. Buchanan	Dudley, Mo	Mange and complications	Treated
May 23	Letter from Dr. H. F. Boettner	7 cows	Henry Heinbokel	Clearyville, Mo	Plant poisoning	Dead
23	Telegram from county court	4 "	Quincy Wagster	Cottonwood Point, Mo	Rabies	Advised killing and confining dogs
31	Letter from Dr. E. Lee	1 mule	P. J. Rupp	Chillicothe	Acute glanders	Quarantined
June 3	Petition	2 mules	Michael Elmore	Marshall	Chronic glanders	"
8	Letter	1 horse	W. H. Watson	3100 Franklin ave., St. Louis	Glanders	Dead
16	Letter from Jno. Long, Co. clerk	Cattle and hogs	Steve Criswell & others	Latty	Rabies	"
15	Petition	1 horse	James Klink	Huntsville	Chronic glanders	Quarantined
20	"	18 horses & mules	Mike Elmore	Marshall	" "	"
July 1		12 horses & mules	" "	"	" "	"
12		3 horses	Waltz & Reece	Troy	" "	"
16	Returned to retest	2 horses	Mike Elmore	Marshall	" "	"
16	Message	1 mule, 1 cow	W. E. Parker and Mr. Wallace	Vandalia	Ergotism	Advised change of pasture
28	Return visit	2 horses, 2 mules	Mike Elmore	Belleflower	Glanders	Quarantined
Aug. 11	" "	2 horses	" "	Marshall	"	"
27	" "	1 mule	" "	Belleflower	"	"

ANNUAL REPORT OF DR. D. F. LUCKEY, STATE VETERINARIAN, FOR YEAR 1904—Continued.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904.						
Sept. 5...	Return visit....	10 horses & mules	Mike Elmore......	Marshall......................	Glanders............ .. .	Quarantined........ ....
17...	Telegram to Dr. Chas. Query ..	3 cows............	T. W. Deneke........	Houck	Rabies.....................	Dead..........................
Oct. 11...	Return visit....	3 horses...... ...	Mike Elmore...........	Belleflower......	Glanders	Quarantined ....
12..	" " ...	1 horse.....	" "	Marshall.....	"	" .. ..
14...	Letter from W. T. Dougherty.	1 mule.	George Tandy..........	1234 Bayard ave., St. Louis..	"	" ... .
15...	Petition.........	Cattle.......	Mackey Bros............	Bliss..........................	Lump jaw and scours. ..	Gave treatment.... ....
Oct. 23..	Letter.	Cattle......	George Chinn.	Clarence, Mo.................	Intestinal worms.........	Advised treatment. ....
Nov. 2...	"	50 horses and mules.........	C. L. Whitener.... .. Frank Allbright and others......	Marquand, Mo..............	Quittor..............	Treated......................
22.	Petition.........	5 cattle..........	T. P. Potter & Sons....	Clifton, Mo....................	Intestinal worms.........	Advised treatment... ....
25...	U. S. Inspector.	340 sheep.... ...	100 to Herring & Sons. 120 to A. Dryden... .. 120 to F. W. Long.....	Shamrock .... Montgomery City....... ... New Florence..........	Scabies	Quarantined.................
26...	"	321 sheep..... ...	Ed. Wilburn........ E. D. Vandevenier.	Laddonia, Mo.	Scabies	" ....
29...	Letter	1 horse.....	Karl L. Morley.........	Old Orchard, Mo.......	Glanders	" ....
Dec. 4..	"	1 "	John Macker.......	4316A Papin St., St. Louis....	"	" ....
18..	Return visit.....	2 horses....	Mike Elmore...........	Marshall.	"	" ....

ANNUAL REPORT OF R. C. MOORE, DEPUTY STATE VETERINARIAN, FOR THE YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1903. Dec. 16	Owner	Gray gelding	Geo. Dean	1510 Locust St., Kansas City.	Chronic glanders	Quarantined and reported to County Court.
17	"	Black "	Missouri Coal Co.	15th & Askew St., Kansas City	" "	Quarantined and reported to County Court.
19	"	" "	W. B. Halpin	4201 Oak St., Kansas City	" "	Quarantined and reported to County Court.
20	"	Chestnut "	R. J. Flynn	1923 Forest Ave., Kansas City	" "	Quarantined and reported to County Court.
23	"	Bay "	S. P. Kirkbride	1102 Cherry St., Kansas City.	" "	Quarantined and reported to County Court with Mallein test
25	"	Gray mare	Sappington & Clement.	1701 E. 9th St., Kansas City	Nasal catarrh	Quarantined and reported to County Court with Mallein test
26	"	Black gelding	S. L. Bradley	1821 Grand Ave., Kansas City	Chronic glanders	Quarantined and reported to County Court.
30	"	Gray mare	L. Ervin	Lees Summit, Mo	Suspected glanders	Quarantined
1904. Jan. 6	Owner	Black gelding	H. Prince	2606 Woodland ave		
7	"	Bay gelding	J. H. Tramill	1519 Brooklyn ave.	Chronic glanders	Quarantined and reported to court.
8	"	Bay gelding	F. L. Cline	1325 Main st	" "	Quarantined and reported to court.
8	Dr. T. W. Hadley	Bay gelding	Sheehy Transfer Co.	817 Washington st	Purpura	
9	Owner	Bay gelding	S. J. Pryor	207 Delaware st	Chronic glanders	Quarantined and reported to court—Mallein test.
11	Dr. A. Trickett.	Roan gelding	Peoples' Ice & Fuel Co.	8th and Mulberry	" "	Destroyed by the consent of owner.
11	Owner	Black gelding	S. L. Bradley	1821 Grand ave	" "	Quarantined and reported to County Court.
16	"	Horse	S. J. Pryor	207 Delaware	" "	Destroyed before arrival.
17	"	Bay mare	Charles Newcastle	1509 Olive st	" "	Quarantined and reported to court.
18	Dr. Byrd	Sorrell gelding	Central Mfg. Co.	107 Lydia ave	" "	Quarantined and reported to court.
20	Owner	Bay gelding	D. B. Norton	2329 Locust st	" "	Quarantined and reported to court.
20	"	White gelding	W. T. Hacker.	23 E. 33rd st	" "	Quarantined and reported to court.
28	"	Gray gelding	Dehoney Hay & Grain Co.	1217 W. 11th st	" "	Quarantined and reported to court.
Feb. 1	"	Bay gelding	J. Deardorff	1407 Cherry st	" "	Quarantined and reported to court.
6	"	Bay gelding	J. Runkle	1428 Holmes st	" "	Quarantined and reported to court.

ANNUAL REPORT OF R. C. MOORE, DEPUTY STATE VETERINARIAN, FOR YEAR 1904—Continued.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904. Feb. 23	Owner	Bay gelding	Warneke Bakery Co.	1509 Grand ave.	Chronic glanders	Quarantined and reported to court
26	"	Bay gelding	J. W. Hurlburt	24th and Oakley	" "	Quarantined and reported to court
27	Dr. Byrd	Bay gelding	O. F. Chandler	410-12 W. 6th st	" "	Destroyed by the consent of owner
28	Owner	1 blk. mule and 2 blk. geldings	Edwards & Hurd	Pleasant Hill, Mo	" "	Quarantined and reported to court
March 2	"	1 bay gelding	Roland Emmerman	1810 Oak st	Chronic glanders	Quarantined and reported to court
2	"	Horse	D. R. Morr	14th and Baltimore	Horse not found	
3	"	1 black gelding	W. J. Crute	20 W. 4th st	Chronic glanders	Quarantined and reported to court
16	"	1 black mare	C. J. Rudd	2535 Park ave	" "	Quarantined and reported to court
22	"	1 bay gelding	W. S. White	108 W. 5th st	" "	Quarantined and reported to court—Mallein test
23	"	1 gray gelding	W. Curtis	1820 Flora ave	" "	Quarantined and reported to court
23	K. C. Fertilizing Works	Horses	Walcott & Beers	23rd and Grand	Stock yards fever	
26	Owner	1 gray gelding	Claggett Storage Co.	1316 W. 8th st	Skin eruption	
28	"	Gray mare	" "	" "	Urticaria	
30	Mr. Gentry	Chestnut geld'g	George Slatton	Independence	Head injured	
30	" "	Bay gelding	Gassett & Searcy	"	Chronic glanders	Quarantined and reported to court
31	" "	Bay gelding	Robert Hall	"	" "	Quarantined and reported to court
13	Mr. Gentry	Bay gelding	Mr. Moore	Independence	Gangrenous lung	
30	Owner	Black gelding	M. Krockover	4700 State Line, Kansas City.	Chronic nasal catarrh	Mallein test
May 1	"	Gray gelding	Geo. S. Dean	1510 Locust St., "	Chronic glanders	Quarantined and reported to County Court
3	Humane Officer Gibbons	Black gelding	Not found	13th and Main Sts., "	Emphysema facial sinuses	
8-9	Owner	Bay gelding	I. Zigelman	412 E. 18th St., "	Chronic glanders	Quarantined and reported to court—Mallein test—night.
9	Dr. Warner	2 gray geldings, 1 blk. gelding, 1 blk. mule	Laning-Harris Coal & Grain Co.	2101 Grand Ave., "	" "	Quarantined and reported to court — Mallein test — day light
10	"	Horses	Laning-Harris Coal & Grain Co.	" " "	" "	Second inspection—was hidden

11	"	1 bay gelding	Laning-Harris Coal & Grain Co.	" " "	" "	Quarantined and reported to court
15	Mr. Cole	Bay gelding	Ed. T. Welch	811 Kansas Ave., Independ'ce	" "	Quarantined and reported to court
15	Owner	Black gelding	Tony Garyotte	307 Oak St., Kansas City.	" "	Quarantined and reported to court
17	"	Bay gelding	J. Donnelly	1503 E. 17th St., "	" "	Quarantined and reported to court—Mallein test
18	"	Brown mare	John Loth	1118 Holmes St., "	" "	Quarantined and reported to court
19	"	Brown mule	J. G. Wade	237 Forest Ave., "	" "	Quarantined and reported to court
22	"	Gray gelding	W. S. Marsh	2425 Locust St., "	" "	Quarantined and reported to court
24	"	Black gelding	W. J. Crute	20 E. 4th St., "	" "	Quarantined and reported to court
26	"	" "	J. C. Bradshaw	1322 Vine St., "	" "	Quarantined and reported to court
27	"	Chestnut geldi'g	Geo. C. Bartells	Independence	Suspected glanders	Quarantined
28	"	Bay gelding	H. Maas	2004 Grand Ave., Kansas City	Chronic glanders	Quarantined and reported to court
29	"	Gray gelding	A. Tyler	1730 McGee St., "	" "	Quarantined and reported to court
30	Owner	Black mare	J. M. Surface	1832 Grand Ave., Kansas City	Chronic glanders	Quarantined and reported to court
June 2	"	Dun gelding	George Owens	2456 Vine St., "	Purpura haemorrhagica.	
4	"	Chestnut geld'g.	George C. Bartell	24th and Denver, "	Chronic glanders	Quarantined
6	"	Bay gelding	Zartman-Thalman Carriage Co.	1225 McGee St., "	" "	Quarantined and reported to court—Mallein test
7	Board of Agri.	Black mare	Thomas Gregg	Pleasant Hill	Strangles	
8	Owner	White gelding	Timanns & Jones	820 S. W. Bvd., Kansas City	Chronic glanders	Quarantined and reported to court—Mallein test
9	Humane officer.	Bay gelding	John Defel	Stall 4, city market, "	Alveolar periostitis	
10	Owner	" "	H. A. Valle	1834 Jackson Ave., "	Chronic glanders	Destroyed by owner
11	Dr. Warner	" "	Louis Goldberg	412 E. 18th St., "	" "	Quarantined and reported to court
11	Official Appraiser C. Murphy.	Chestnut mare	John Trent	19 E. 6th St., "	Pluero pneumonia	
17	Owner	Bay gelding	E Landes	818 E. 15th St., "	Summer sores	
20	"	Horse	Lewis Williams	3008 Summit St., "	Chronic glanders,	Destroyed by owner
24	"	Chestnut mare	Bolen-Darnell Coal Co.	1st and Troost Ave. "	" "	Quarantined and reported to court
25	"	Black gelding	W. S. Marsh	2425 Locust, "	" "	Quarantined
25	Humane officer.	Bay gelding	J. Rena	425 Walnut St., "	Chronic catarrh	
26	Owner	Gray gelding	E. B. Bruce	5400 Troost Ave., "	Chronic glanders	Case on farm south of city—destroyed by owner
29	County clerk	Brown g. mule	Kate O'Day	2038 E. 19th st., "	" "	1½ miles south of Independence — quarantined and reported to court
July 5	Owner	Gray gelding	A. I. Pendleton	1409 Garfield Ave.	Chronic glanders	Quarantined and reported to court—Mallein test
6	"	Black "	W. S. Marsh	2425 Locust	Suspected glanders	

ANNUAL REPORT OF R. C. MOORE, DEPUTY STATE VETERINARIAN, FOR YEAR 1904—Continued.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904 July 8	Owner	Bay mare	Shelby Majors	2003 W. Prospect Place	Chronic glanders	Quarantined and reported to court
8	"	Black gelding	Tony Garyotto	307 Oak St.	Suspected "	Died before arrival
12	"	7 mules	Mr. Schaeffer	Norborne, Mo.	Anemia verminous	Change of pasture
15	"	Brown mule	Simpson Sayers	2025 Madison Ave	Chronic glanders	Quarantined and reported to court
19	Humane officer	2 bay geldings	Frank Lovett	2839 Bell St.	Nasal catarrh	
20	Owner	Bay gelding	Henry Ebbs	2501 Woodland Ave	Broncho-pneumonia	
22	Sheriff	Horses	Unknown	2421 Grand Ave	No disease	
24	Owner	B. gelding	J. L. Bosch	3918 Genesee	Chronic glanders	Quarantined and reported to court—Mallein test
25		Horse	Unknown	15th and Prospect	Catarrh of frontal sinuses	
26	Owner	Bay gelding	H. H. Knake	618 W. 13th St.	Nasal catarrh	
27	Police departm't	Horse	Parker Washington Asphalt Co.	2309 Penn St.	Purpura	
30	Owner	Bay gelding	Samuels & Holmes	411 Kemper Bld'g.	Acute glanders	Quarantined and reported to court
Aug. 4	Dr. Werner	Gray gelding	Woolf Bros	15th and Prospect	Animal removed before arrival	
5	Mr. Lee	Mule	Unknown	20th and Main	Acute glanders	Destroyed by humane officer
6	Sec'y Mo. State Board of Agr.	2 horses	S. I. Janes	Lees Summit, Mo.	Chronic glanders	Quarantined and reported to court
7	Owner	"	Samuels & Holmes	411 Kemper Bld'g	Suspected "	Quarantined
8	Dr. Werner	Gray gelding	Industrial Opera'ng Co.	1815 Troost Ave	Chronic "	Quarantined and reported to court
11	Owner	Sorrel gelding	Mrs. F. S. Steiner	711 W. 16th St.	Acute glanders	Destroyed by the consent of owner
11	"	Bay g. mule	Sampson Sayers	2025 Madison Ave	Chronic glanders	Quarantined and reported to court
21	Dr. Robt. Dill	Cattle	Otto Frende	Pleasant Hill	Texas fever.	Quarantined
22	County clerk	Horse	Unknown	Independence.	Suspected glanders	Dead on arrival.
22	Owner	Bay gelding	W. A. Green	1608 Quincy Ave., Kan. City	Gangrenous lung	
23	Dr. Werner	Horse	Woolf Bros	15th and Prospect	Suspected horse not fo'nd	
24	Owner	Chestnut geld'g	George C. Bartell	24th and Denver	Chronic glanders	Quarantined and reported to court
26	"	Bay gelding	Dr. Trickett	1511 McGee St.	" "	Quarantined and reported to court
29	"	Bay gelding	H. L. Crump	1806 E. 12th St.	Suspected glanders	Quarantined and reported to court—Mallein test
Sept. 2	"	2 bay geldings	Samuels & Holmes	37th and Roanoke Blvd	" "	Quarantined
10	"	Brown gelding	John P. Tungett	S. E. cor. 32d and Cherry	Chronic glanders	Quarantined and reported to court
11	"	Bay gelding	H. L. Crump	1806 E. 12th St.	" "	Quarantined and reported to court
17	Dr. Robt. Dill	Cattle	Otto Frende	Pleasant Hill	Texas fever	Quarantined

21	Humane officer.	Gray gelding	Gray Transfer Co.	608 Prospect, Kansas City	Chronic glanders	Destroyed by the consent of owner
22	Dr. Doak	Bay gelding	Unknown	47th and State Line	Nasal catarrh	
27	Owner	Gray gelding	D. W. Keesling	1905 Highland	Chronic glanders	Quarantined and reported to court.
29	"	Black mare	Squire Smith	Harlem	" "	Quarantined and reported to court.
Oct. 1	"	1 horse	John Anderson	1704 Lydia Ave., Kansas City	" "	Quarantined and reported to County Court
1	"	"	Mrs. Emma Catling	1915 Lydia Ave., "	" "	Quarantined and reported to County Court
3	"	"	Judge Osborn	Lexington	Paralysis pharyngeal muscles	
5	Sec. Board Agri.	Cattle	W. E. Long	Marshall	Texas fever	Quarantined
7		2 horses	Jim Williams	2404 Mich. Ave., Kansas City	Chronic glanders	Quarantined and reported to County Court
9	Owner	1 horse	Alex. Bandel	1826 Kansas Ave., "	" "	Quarantined and reported to County Court
9	W. L. Bryant	"	Mr. McElroy	Independence	Suspected glanders	Quarantined and given Mallein test
10	Owner	"	Alex. Bandel	1826 Kan's Ave, Kansas City	Chronic glanders	Quarantined and reported to County Court
12	W. L. Bryant	"	Mr. McElroy	Independence	Suspected glanders	Mallein test
16	Owner	2 horses	Samuels & Holmes	37th and Roanoke Sts., Kansas City	" "	Quarantined and held
17	"	1 mule	Central Coal & Coke Co.	20th and Main, Kansas City	Catarrh	
21	"	1 horse	Geyser Min. Springs Co.	Rosedale, Kan	Glanders	Destroyed by the consent of owner
21	Drs. James-Burr	108 cattle	Charles W. Wright	Cameron, R. R. No. 5	Texas fever	Quarantined
23	Mr. Moon	1 horse.	H. C. McKinney	4201 E. 12th St., Kansas City	Not found	
24		Cattle	W. E. Long	Marshall	Texas fever	
24		1 bull	Newton Long	Sumner, route 1	Catarrh	
25		Horses	J. P. and W. D. Mulenix	Lagonda		
26	Owner	1 horse	W. E. Powell	5 Drury St., Kansas City	Chronic glanders	Quarantined and reported to County Court
26	Telegram	17 cattle	Geo. W. Needles	Albany	Texas fever	Quarantined
29	Owner	1 horse	Squire Smith	Harlem	Chronic glanders	Quarantined and reported to County Court
Nov. 13	"	"	J. M. Goslin	3203 Cherry St., Kansas City	Nasal catarrh	
15		"	John Loth	33rd & Summit Sts., "		
26		1 bay mare	S. J. Beltcher	2423 McCoy Ave., "	Chronic glanders	Quarantined and reported to County Court
Dec. 4	Mr. Hollister	1 horse	Unknown	26th & Wyandotte, "	Purpura	
17		"	S. Stewart	1330-36 E. 15th St., "	Chronic glanders	Destroyed without app'em't.
18		"	Squire Smith	Harlem	" "	Quarantined and reported to County Court
19	Owner	"	Fred Wolferman	11th & Walnut Sts., Kan. City	Purpura	Mallein test

ANNUAL REPORT OF F. W. O'BRIEN, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904						
Jan. 21	Sec. Board Agri.	3 horses	S. C. Stanley	Eolia	Mange	Advised treatment
April 14	" "	7 horses	Geo. H. Nelson	Philadelphia	Strangles	Advised disinfection of barn
23	" "	6 horses	J. D. Reece	Troy	Chronic glanders	Quarantined and reported to County Court
May 10	" "	1 horse	F. H. McCullough	Edina		Dead on arrival
Sept. 8	" "	1 mule	W. T. Sydnor	Corso	Caseous tumors	Advised treatment
13	Came under personal observ'n	Cattle	J. F. Davidson	Hannibal	Texas fever	Quarantined
22	Sec. Board Agri.	1 mule colt	Mr. Kerrick	Emerson	Crusta tabalis	Prescribed treatment
Nov. 5	" "	4 horses	Ed. W. Hansgen	Apex	2 pneumonia, 1 indigestion, 1 strangles	Dead on arrival
11	Letter	1 horse	M. Elmore	Belleflower	Chronic glanders	Quarantined
11	Letter	2 mares	W. E. Miller	"	Suspected farcy	"
Dec. 4	Letter	Sheep	Boone Bros	Ely	Scabies	"
15	Sec. Board Agri.	2 black mares	E. Miller	Belleflower	Chronic farcy	Quarantined and reported to County Court

ANNUAL REPORT OF LYMAN D. BROWN, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904						
Feb. 8		1 cow, 2 horses	Mrs. M. A. Denny	Lucerne	Tenia tonsurans	Ordered treatment
24	Petition	6 horses	Dr. W. E. Bradley	Ethel	Scabies	Isolated
Mar. 5	Telegram	15 cattle	J. P. Tracy	Cameron	Ergotism	
15		Cattle	T. B. Hulse and others.	Princeton	"	Advised change pasture and feed
May 23		27 cattle	John Gibson	Hamilton	Anthrax	Quarantined
June 17	Dr. Shikles	1 horse	Mrs. Lucy E. Barley	Lilly	Suspected glanders	"
29	Found in pract'e	5 horses	William Whitsel	Hamilton	Chronic glanders	"
July 9	Telegram	Mules & horses	Jacob Schaffer	Norborne	Parasites	Treated and ordered change of pasture
Aug. 11	Petition	13 horses & mules	Frank L. Vinyard	"	Glanders	3 ordered killed, 11 quarantined
Sept. 15		Horses	J. P. Mulnix	Lagonda	Not determined	
15		14 horses	Frank L. Vinyard	Norborne	Glanders	2 killed, 9 quarantined
27		1 mare	" "	"	Acute glanders	Ordered killed

ANNUAL REPORT OF HORACE BRADLEY, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1903. Dec. 31...	Sec. Board Agri.	1 mule..........	Wm. Hellums..........	Elkton, Mo..................	Chronic glanders.........	Quarantined and reported to County Court.......... .....
1904. Jan. 12...	" "	1 horse..........	H. C. Jones............	Clinton, Mo..	" "	Quarantined and reported to County Court... ....
April 14...	" "	1 mare.....	R. M. Gragg............	Urich, Mo.........	" farcy....	Quarantined and reported to County Court.. ....
May 21...	" "	"	Geo. F. Parks..........	Coale, Mo..........	" "	Quarantined and reported to County Court...............
June 6...	Tel. Sec. Board Agriculture....	6 horses & mules	Peter Farris.	Adrian, Mo............	Cerebro spinal men'gitis	Advised change of feed......
July 10...	Sec. Board Agri.	7 "	J. I. Brooks............	Rich Hill, Mo................	Strangles..................	" " pasture..
Aug. 23...	'Phone from Dr. Bass...........	18 steers....	J. C. Bourlier..........	Leeton, Mo	Texas fever.......... ...	Quarantined and reported to County Court.. ....
25...	Second visit.....	17 "	" "	"	" "	....
28...	Investigt'n with above case.....	5 cattle....	Jas. W. Ward, C. E. Jimes, W. L. Jones...	Warrensburg, Mo............	" "	Quarantined.................
29...	....	11 "	Chas. Baker............	Leeton, Mo...	Suspected Texas fever...	Advised isolation............
Sept. 10...	Drs. Klutz and Cress...........	2 "	W. R. Farnsworth	Blairstown, Mo......	....	....
11...	Dr. Klutz........	4 calves.....	Dr. Phillip..............	Cloa, Mo.	Appendicitis...............	Advised treatment..........
11...	Sec. Board Agri.	1 horse.....	John O. Trigg..	Lowry City, Mo........	....	....

ANNUAL REPORT OF H. V. GOODE, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1903 Dec. 25...	Came to office...	3 horses	Tolin Bros..............	St. Joseph..	Glanders	Destroyed....................
27...	....	3 horses....	"	"	"	" ....
1904 Jan.12 3...	Sent by Board..	1 horse..........	Wm. J. Beal	Filmore...	Chronic catarrh...........	....
Feb. 5...	" " ..	1 horse.	Henry Smither..........	New Market..	Sub-acute pharyngitis...	Gave treatment ....
Mar. 5...	State Veterin'n.	Sheep	L. P. Munson...... ...	Union Star	Scabies....................	Quarantined ....
24...	" "	Cattle............	J. P. Titus..............	Lawson	Scab......................	" ....
April 25...	" "	52 cattle	A. W. Chunning........	Bigelow	Scab.....	" . . ..
25...	" "	35 cattle	John E. Slater..........	"	Scab........	" ....

ANNUAL REPORT OF R. B. LOVE, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904						
Jan. [illegible]...	Order Secretary.	1 mare....	H. F. Kennedy	Springfield	Ulcerated tooth......... ..	Advised treatment..........
[illegible]...	" "	1 horse....	M. Steineger...........	"	Chronic glanders.........	Quarantined ....
Mar. [illegible]...	In private pract	1 mule	R. F. Young...........	" ....,.....	" "	" ....
26...	Order Secretary.	....	Jos. S. Ramey	Duncan......................	Chronic indigestion......	Gave treatment......... .....
June 6...	" "	2 horses....	T. J. Simpson...........	South Fork....................	Chronic gland'rs & farcy	Quarantined ....
7...	" "	1 mare.....	J. W. Morgan..........	Stultz..............	Chronic glanders.........	" ....
July [illegible]...	Dr. Parker......	1 horse...........	A. Gay............	Elwood	" "	" ....
Sept. 6.	Dr. Luckey	Cattle............	Walter Fraser..........	Sleeper	Scab	" ....
9...	Order Secretary.	1 horse..... ...	James York.	Fair Play...	Laryngitis........	Gave treatment...............
12...	Dr. Luckey.....	2 horses...	Mr. Bissett......... ...	West Plains...........	Laryngeal abcess........	" " ....
Oct. 20...	Order Secretary.	1 horse.........	Holman Fruit Co.	Holman.................. ...	Supposed glanders......	Dead on arrival...............
25...	" "	Hogs............	A. Glassey and others.	Cuba.......	Worms..	Gave treatment...........
Nov. [illegible]...	" "	1 horse....	Crow Harrison......	Richland......	Ulcerated tooth..........	Advised extraction..... .....

ANNUAL REPORT OF E. M. HENDY, DEPUTY STATE VETERINARIAN, FOR THE YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1903.						
Dec. 2[illegible]...	Telephone.......	Cattle...	J. McDowell....	Enon, Mo......	Blackleg................ ..	Advised vaccination.........
1904.						
Mar. 12...	Letter	Cattle and hogs.	Mr. Williams............	Marys Home, Mo....	Rabies..............	Dead on arrival. ....
Aug. 29...	"	Sheep	P. F. New....	Auxvasse. Mo.....	Scab..................	Quarantined ....
Nov. 30...	Telephone.......	Cattle...... .. .	Sebastian Schellman...	Osage Bluff, Mo....	Blackleg.	Advised vaccination.... ....

REPORT OF H. H. WOLF, DEPUTY STATE VETERINARIAN, FOR THE YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904.						
Mar. 23...	Dr. Luckey.....	Cattle......	Quitman Stock Yards..	Quitman, Mo.................	Scab.....	Quarantined ....
June 18...	"	Sheep.........	Samuel Corrough......	Arkoe, Mo......	Scabies	" ....

ANNUAL REPORT OF T. E. WHITE, DEPUTY STATE VETERINARIAN, FOR THE YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1903. Dec. 17...	Sec. Board Agri.	17 calves..... ...	Geo. B. Jones......... .	Todd, Mo...............	Verminous bronchitis....	Advised treatment..........
19...	" " "	1 mare...........	Jas. W. Wilson.....	Clinton, Mo....	Chronic farcy............	Quarantined ....
21...	" " "	1 "	Thos. Burnfins..........	Edwards, Mo................	Nasal catarrh...........	Advised treatment..... .....
1904. Mar. 22...	" " "	156 lambs........	R. E. Guthrie..........	Lamonte, Mo.................	Scabies....................	Quarantined......... ... .
June 18...	Tel. Sec. Board Agriculture....	2 horses, 1 mule.	Hon. W. L. Bryant.....	Independence, Mo...........	....	Dead on arrival..............
July 12...	J. H. Buck......	2 mules, 2 horses	Thos. Baker..	Mo. Pac. shop grounds, Sedalia.........	Acute glandes	Killed... ....
15...	"	1 mule...........	J. H. Buck	Mo. Pac. shop grounds, Sedalia.........	Farcy and glanders.....	" ....
16...	Frank Craig.....	1 "	Frank Craig.	320 Saline St., Sedalia...	" "	" ....
20...	In pers. practice	1 horse....	S. L. Cavenaugh..... ..	Mo. Pac. shop grounds, Sedalia....	Acute glanders.	" ... .

ANNUAL REPORT OF JAMES CULLISON, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904 Jan. 20...	Dr. Luckey.....	1 mule...........	John Gray...............	Sikeston......................	Polypus & cyst in nasal cavity..............	....
Feb. 29...	Sec. Board Agri.	1 horse...........	Antoine LeGrand.......	Benton	Chronic catarrh..	Advised antiseptic injection
Sept. 20...	Tele'm from Sec.	5 cows.......... .	Joseph Bollinger......	Graysboro.....................	Texas fever..........	Advised isolation............
24...	Sec'y Board.....	1 horse...........	John R. Dobbs	Annapolis.....	.. ..	Dead on arrival......... ....
26...	" "	Cattle............	Joseph Bollinger... ..	Graysboro....	Texas fever.	Advised isolation............

ANNUAL REPORT OF W. F. BERRY, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904 Feb. 1	Wire from Sec'y.	2 horses	S. M. Smith and others	Lamar	1 acute glanders and 1 chronic glanders	Quarantined
9	" "	17 cattle	C. G. Hitchcock	Jasper		
16	Dr. Luckey	28 sheep	Warren & Shantz	Conway	Scabies	Quarantined
Mar. [illegible]	Petition	1 horse	Manoah Miller	Rocky Comfort	Suspected glanders	"
Aug. [illegible]	Letter	"	W. F. Stafford	Medoc	Glanders	Dead on arrival
Sept. 2	"	"	T. V. Montgomery	Sheldon	Ulcerated tooth	

ANNUAL REPORT OF E. BRAINERD, DEPUTY STATE VETERINARIAN, FOR YEAR 1904.

Date.	How called.	Kind of stock.	Owner.	Postoffice.	Disease.	How disposed of.
1904 Nov. 12	Letter	25 cattle	C. E. Schee	Chambersburg	Tuberculosis	1 killed and 1 quarantined

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